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MECHANIC ARTS, MANUFACTURES, GENERAL SCIENCE,

AND THE RECORDING OF

AMERICAN AND OTHER PATENTED INVENTIONS.

DECEMBER, 1830.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN OCTOBER, 1830.

With Remarks and Exemplifications, by the Editor.

1. For an improvement in the construction of *Fulling Mills and Power Looms;* Anson Atwood, Salem, Washington county, New York, October 1.

The beaters, or hammers, of this fulling mill, are of the usual construction; are suspended, and swing, as in other fulling mills; but the lever, or rods, by which they are carried backwards and forwards, are not acted upon directly by a crank, but have a joint in them near their middles, working like a rule joint. Cranks placed above these rods, raise and depress them by means of pitmen, and thus cause the hammers to vibrate; one end of these compound levers is fastened to the hammer, and the other works upon a pin in the frame behind it.

We do not perceive the advantage of this arrangement, but will let the patentee speak for himself; and he says, "the advantages of this improvement are a gain of power, and a more gradual and equable motion of the hammers, better conducing to the fulling of cloth; also a diminution of expense, in crank, and gearing, and repairs."

The same kind of joint he proposes to apply to the power loom to act on the lathe in beating up, which is to be advantageous, "by giving two blows, instead of one." The claim is to "the application of a compound jointed lever, or the 'engine of oblique action,' to a fulling mill and power looms."

2. For a *Lamp Reflector;* Edward Brown, Dover, Strafford county, New Hampshire, October 1.

The patentee undoubtedly thinks this a new thing over a lamp, although there is "no new thing under the sun." We will endeavour to enable our readers to judge between him and the first Solomon.

This lamp reflector is to be made of tin, or other polished metal. Its form is to be that of "a tin liquor tunnel." This conical reflector is to be suspended by its apex, and the lamp hung under its centre, by which means the light will actually be reflected downwards. The reflector may be fluted, if that form is preferred. The *novelty* is not pointed out; as there is no claim, the patentee "goes for the whole" reflector.

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3. For an improvement in the *Springs of Door Locks, and other Locks, by means of Elastic Wire,* called "The Wire Lock Spring;" Job Baker, New Bedford, Bristol county, Massachusetts, October 1.

A piece of iron, or other wire, which may be about one-eighth of an inch in diameter, is to be substituted for the flat steel springs now in use. This wire may have two, three, or more spiral turns, where the screw fixes it. It is proposed not only to substitute this for the common spring to the spring bolt, but also to make it act the part of the spring and tumbler to the lock bolt. For this purpose one end of the wire is to pass round the inside of the box of the lock, so as to bring it under those notches in the bolt into which the tumbler usually catches. To secure its falling into these notches, the wire is to be bent up at right angles. A part of the wire is to have a round bend, in order that the key, as it turns, may touch it, just as it does the curved edge of the common tumbler; the key will thus lift the wire out of the notch and allow the bolt to be advanced, or withdrawn. The claim is to the use of wire in the way above described.

As respects the use of wire to act upon the spring bolt, although it may never have been patented, we know that it has been used, as we have employed it ourselves, in our domestic repairs, and we have no doubt that others have done the same. We apprehend that it is one of those contrivances to which any maker of mouse traps, or other worker in wire, would be apt to resort, should he undertake to repair the spring of his own door lock. We have for the same purpose used a piece of whalebone, which has continued to act well for years; we, however, have not taken a patent for it.

For the spring and tumbler, the wire is a poor substitute, as the bolt may readily be forced back, because it is retained in its place merely by the bent wire, which acts only as a spring, and will easily give way.

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4. For *Machinery for Hulling and Cleaning Rice, and Coffee, and for Trip Hammers, Powder Mills, Washing*

Cloth or Clothes, and for Pounding any kind of Ore or Stone, and for Pounding and Mixing Mortar, for Making Brick, or any other use; Joseph Beach, Middletown, Middlesex county, Connecticut, October 1.

Twenty-five mortars are to be set round in a circle of twenty-nine feet in diameter. The pestles are long vertical pieces of timber, sliding up and down through mortises. These are to be lifted by levers, which converge towards the centre of the circle. By a vertical shaft, four wheels are carried round upon horizontal shafts, which, as they roll, press upon the inner ends of the levers, and thus raise the pestles. These wheels are made wide, that the inner part of their peripheries may be supported upon a circular platform, or rail-way, whilst their outer edges, projecting beyond the rail-way, operate upon the levers. The mortars are made in the shape of an egg with the lower end cut off for a small distance; these mortars rest upon suitable blocks, and their upper ends are, of course, open, to admit the pestles.

It is proposed to make longitudinal slits from the top to within six inches of the bottom of these mortars, to allow the dust formed in the pounding to escape. When mortar is to be mixed, ores pounded, or trip hammers worked, the proper troughs or anvils are to take the place of the mortars.

The claim is to "the mode of applying the power by means of wheels to the levers, and the combination of the various parts of the machinery as aforesaid, in such a manner as to produce the result."

The longitudinal slits, and the shape of the mortars, when applied to the cleaning of rice, seem to trench upon Mr. Ravenel's patent, referred to in a note, p. 317, in the last number. In the English patent, on the same page, these longitudinal slits are mentioned. Their effect is the same as the wire work in Mr. Ravenel's mortars, and any claim to them by any person informed upon the subject, would, manifestly, be an attempt to evade his patent.

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5. For a *Purcussion Lock, and Vent for Cannon;* Lieut. William H. Bell, Fortress Monroe, Virginia, October 1.

We are not aware of what constitutes the peculiarities in this lock, when compared with others which have been used for the firing of ordnance; as, excepting in the mere arrangement of the parts, we do not think that it is new. The vent is countersunk to receive the primers, upon which the hammer is to strike. The hammer face is of steel, and made to fit into the countersink. The hammer handle projects back, and is supported upon a joint attached to the breech plate. The tail of the hammer is held down by a catch, and, when this is released, a spring, attached to the cascabel by means of screws, forces it down.

The vent is not placed on the top, in the usual manner, but is removed towards one side, so that the sight is not obstructed.

As all the parts are described, without particularizing those which the present patentee has invented, the whole patent may be en-

dangered by this neglect. Thus the countersinking of the vent, to receive the primer, stands as conspicuously as any other part of the arrangement. Is this new?

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6. For a water wheel, and the manner of applying the same to the *Propelling of Canal Boats, and other Water Craft;* Henry Ovinel, Richland, Oswego county, New York, October 1.

The mode of propelling proposed in this patent, has been so often noticed in this Journal, and its utter uselessness set forth, that we need not take up more space on the present occasion than what is merely necessary to a brief description of this re-proposed plan. Spiral screw wheels, or shafts, are to be placed in tubes on each side of the boat, or under its centre. The tubes are to extend nearly from stem to stern. It is proposed to make the tubes about a foot in diameter, with the revolving screws nearly filling them. There is no claim either to the wheels, shafts, or tubes.

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7. For an improvement in the *Machine for Cutting Crackers, Sugar and other Biscuit,* for which a patent was obtained on the 16th day of March, 1830, which patent is cancelled on account of an incorrect specification; Thomas Bladen, Philadelphia, Pennsylvania. Re-issued, October 1.

"The invention here claimed is the mode of forcing a portion of the dough through the bed plate, as before described; the adaptation of spiral springs to the raising of the cutters; and the making of the set of cutters out of a solid piece of metal."

There have, of late, been so many improved machines for cutting crackers and biscuits, that we cannot attempt to analyze their respective claims to superiority; and we apprehend that most of our readers are more concerned about the machinery for grinding crackers after they have been made, than for that which the baker employs in forming them. The present specification appears to contain a description of some new parts, substituted for those used in the first instance; in this case a new patent ought to have been taken for an improvement upon the machine patented in March last; otherwise something more is done than merely inserting what was omitted, or omitting what was inserted, through inadvertency.

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8. For *Wheels, Pinions, or Movements for Clocks,* made of glass, instead of the substances or materials which have been heretofore employed; John P. Bakewell, Pittsburgh, Allegheny county, Pennsylvania, October 1.

(See specification.)

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9. For making *Conduits for Conveying Water or Gas under Ground;* John M. Benham, Bridgewater, Oneida county,

New York; first issued August 9th, 1827, cancelled and re-issued with a corrected specification, October 1st, 1830.

What is intended by correcting an erroneous specification, seems, in most instances, to be altogether misunderstood by patentees. We have rarely compared the new with the cancelled specification, without finding them essentially different in their purport; and such, we think, is the case in the present instance.

The original patent stated the improvement to be "in making aqueducts for conveying water, or gas, under ground by means of a conductor formed of water proof lime, *as a cement for stone, wood, or brick.*" In the claim appended to the new specification, the patentee says, "I claim as my discovery, invention, and improvement, that conduit pipes for the conveyance of water, or other fluids, may be *made of water lime cement alone*, of sufficient firmness, strength and durability, to answer a most valuable purpose." In the former specification it is said that the grounds upon which a patent is claimed, is the discovery of using "water proof lime as a cement for cementing stones, or brick, or wood, or for moulding this lime into aqueducts for the carrying of water or gas under ground."

That which originally appears to have been introduced as a mode which *might* be occasionally adopted, forms the exclusive object of the present patent; whilst that which was the main design of the former is not even mentioned in the new specification.

The mode of procedure now prescribed for forming the conduits, is to place, in the trench that has been prepared for the purpose, a quantity of mortar, made of water proof lime and sand, and upon this to lay a cylindrical mould or core, which is then to be covered with the same kind of mortar; when this has hardened sufficiently, the core is to be drawn nearly out. The extreme end of the core is to be made of leather, or other flexible material, stuffed to make it preserve its cylindrical form, but flexible for the purpose of allowing the core to turn up out of the way whilst laying a new bed, and also to admit the turning of corners.

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10. For *Saccharifying Rye and other kinds of Grain, &c.;* A. J. Brasier, Philadelphia, Pennsylvania, October 1.

(See specification.)

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11. For *Saccharifying Rice and Maize;* A. J. Brasier, Philadelphia, Pennsylvania, October 1.

(See specification.)

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12. For an improvement in the *Thrashing Machine;* Robert L. Caustin, Ledyard, Cayuga county, New York, October 1.

The general structure of this machine is the same as those most ordinarily employed, but instead of the common beaters upon a cylinder, there are six round rods of iron, passing from one head of the cylinder to the other, and upon these are to be placed short iron

flails, which the patentee calls teeth. The teeth are to play freely upon the rods, are to be about three inches in length, and round, square, or oval, as may be preferred.

"The inventor claims the right of every modification of said machine, which shall be consistent with the hanging and playing of the teeth as above described."

There is already a patent in existence for hanging short flails to the revolving cylinder of a thrashing machine. The mode of hanging differs from that described above; and if the patent is to be considered as confined to this mode, they may not interfere. The one to which we allude is upon some of our published lists, but, at present, we must leave to those interested, the task of hunting it out from among the numerous machines for thrashing grain.

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13. For the *Construction and Application of Friction Rollers;* David Baldwin, Queensbury, Warren county, New York, October 1.

(See specification.)

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14. For a *Hill Side Plough;* John P. Cobbs, Nelson county, Virginia, October 1.

The mould board of this plough is made of the same form on each side, in order that it may be capable of turning the sward either way. The mould board and share are attached to the beam of the plough, by means of an iron rod, which runs down, vertically, through the beam, the mould board, and the share. This rod serves as a fulcrum to the mould board and share, which are to be shifted at every return of the plough on a hill side, so that the two sides of the plough may alternately operate as land sides. Behind this rod, a bolt or key passes through the beam, which falls into mortises on the upper side of the mould board, in order to secure it in the different positions required. The bolt is kept in its place by a spring, which must be raised every time the mould board is shifted.

There are some other appurtenances which are described and claimed, but the principal are "the heel bar, the key, and the general arrangement of the several parts of the plough, and likewise the mode of changing the position of the mould board, as before described."

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15. For an improvement in *Ferry Boats, and in Propelling the same;* Matthew D. Brown, Mason county, Virginia, October 1.

A rope, or wire, is to be stretched across a river, in the way common at many ferries. Skiffs are to be moored in the river, to support the rope or wire; each skiff is to have a mast in its centre for this purpose. The ferry boat has stancheons, and pulleys for the rope to pass over, and a rigging rope, with a ring, by which it is attached to the crossing wire, or rope, so that it may stand obliquely

with the current. A lee board is to be lowered and raised by means of a windlass, according to the depth and strength of the current.

"The invention here claimed is the fixing a long rope, or wire, on one side of a river or stream, and holding up the rope or wire by means of floats; the mode of raising and depressing the lee board; the mode of steering the boat; and the ice breakers."

The general plan, if we understand the description, is a very old one; if there are any particular improvements rendering the mode of applying this principle more efficient or convenient, they are either very imperfectly described, or we so perfectly in the dark as to be unable to perceive them.

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16. For a vegetable *Specific for the Cure of Ague and Fever;* Maurice Cannon, City of New Orleans, Louisiana, October 1.

"Take of Tinct. Cardamon, - - 2 oz.
Tinct. of Gentian, - - 2 oz.
Tinct. of Capsicum, - - 1 oz.
Tinct. of Snake Root, - 2½ oz.
Winter Green Water, - 1 oz.
Aromatic Tinct. of Vitriol, 2 drs. } Mix and add
Sulphate of Quinine, - - 20 grs. } to the above.

Grown persons must take one table spoonful of the above in double the quantity of lemonade, sangaree, or cold water, every hour. It will be necessary to commence ten or twelve hours before the usual time of the chills coming on, so as to have the desired effect the first day; and when it only comes on every second, or third day, it will be necessary to commence 18 or 20 hours before the usual time."

This compound resembles the greater number of empirical, and patented medicines; a list is procured of articles said to have cured a certain complaint, the materials upon this list are jumbled together, and it is apprehended that if one of them fails, the other will hit the disease on the head. Like most quack medicines, it may acquire popularity, because it will frequently cure the disease; whilst the cases in which it may do harm from its indiscriminate administration, will remain unknown, no certificates in such instances being sought for, by the venders of panaceas.

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17. For a *Floating Graving Dock*, to be used in building or repairing of ships, steam boats, and other craft, called the "Pittsburgh Floating Graving Dock;" Thomas Cunningham, Pittsburgh, Allegheny county, Pennsylvania, October 1.

This floating dock is proposed to be made 140 feet long, 34 feet wide at the bottom, 36 at the top, and 10 feet deep. These dimensions may, of course, be varied according to circumstances. When the dock is to be used, the water is allowed to enter it, so that it may sink at its moorings, and admit the vessel which is to be repaired to float in. A gate at the stern is then raised to enclose the vessel,

and the water is to be pumped out, care being taken to support the vessel's keel with proper blocks, and her sides with shores.

Directions are given respecting the size of the timbers, the knees, and the thickness of the plank; but we are not told what there is in the structure upon which to found a claim to a patent.

Without travelling abroad, to learn what has been done in other countries, we refer our readers to the detailed report of a committee of the Franklin Institute, on Commodore Barron's floating dock, at page 3, vol. iii. of the Franklin Journal, first series; and to another report in the same volume, p. 424, on a floating dock, invented by Edward Clark, Esq. civil engineer. We think that a perusal of these alone would suffice to convince the patentee, that if a floating dock is patented, he ought to tell in what particulars that which he claims to have invented, differs from those which have been before known.

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18. For *Extracting Cream from Milk;* Samuel Davis, City of New York, October 1.

The specification of this patent is in but few words; we therefore give it entire, as follows.

"This improvement consists in putting zinc, commonly called spelter, into the vessel, or reservoir, containing the milk, or in depositing the milk in pans, or vessels composed of the aforesaid mineral, which decomposes the acrimonious substance that causes the milk to become sour, or rancid. And the same quantity of milk or cream will yield a greater quantity of butter, and of a much finer flavour."

"What I claim is the manner of using the mineral called zinc, or spelter, in the reservoir, or vessels, containing the milk; and preparing vessels, or pans, from the zinc, or spelter.

SAMUEL DAVIS."

We believe this application of zinc to be really "new," whether we may add "and useful," we very much doubt. We cannot conceive of any action which can be exerted by the zinc, in an earthen milk pan, or of any which can take place between it and the milk, unless the acid of the milk, as it is formed, dissolves a portion of the metal, and in this case a poisonous salt will be formed. Zinc is among those metals which are most readily attacked by acids, and all its soluble salts are deleterious. If the effect is as stated, namely, that the milk containing the zinc will not become sour, or rancid, we know of no way in which this can be explained, but by the formation of a metallic salt.

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19. For a *Rail-road Car;* John Elgar, Baltimore, Maryland, October 1.

(See specification.)

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20. For a *Topping to Chimneys for the purpose of prevent-*

ing them from Smoking, called a "Ventiduct Topping;" Joshua Ennis, Brooklyn, Kings county, New York, October 1.

The specification of this patent is a specification of nothing, as it does not pretend to give any description of the thing patented, but seems to suppose that its nature will be known by intuition.

We are told that the *improvement* may be made of stone, brick, wood, or metal. The *standards*, we are informed, may be three and a half inches square; but what these standards are, where they are to be placed, and what end they are to answer, the deponent saith not. The description of every other part is in the like "full, clear, and exact terms." As there is not any thing described, the trouble of making a claim was completely avoided.

The drawing which accompanies this anti-specification, consists of a few parallel lines, like those of ruled music, with vertical lines resembling the bars by which the notes are divided, and is without letters of reference, or explanation.

We are told about a model in the office, which model, we suppose, is left to speak for itself, as the testimony of the written instrument says nothing in its behalf.

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21. For a mode of *Preventing Water, and Cold, from passing under outer doors;* Samuel Durfee, Providence, Providence county, Rhode Island, October 1.

A sloping board, such as is frequently employed as a fender, is fixed at the bottom of the door by means of hinges, which allow it to raise out of the way of the sill. There is a spring beneath the fender, which, acting upon it, tends to lift it up. A pin is driven into the door sill, near to the hinge side, and, as the door closes, this pin presses against the spring and relieves the fender from its action, which then falls by its own gravity. Above the fender a moulding is planted, which serves to throw the water from the door, on to the fender, and thus to prevent its running down through the hinged joint.

The claim is to the manner of fixing the spring, and to the moulding across the door.

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22. For *Machinery for Pressing;* Lecter E. Denison, Saybrook, Middlesex county, Connecticut, October 1.

The follower of this press is to be forced down by the action of two eccentric cams upon the same shaft. One of these cams bears against a friction roller attached to the upper rail of the press frame, and the other against a similar roller attached to the follower. When the shaft upon which the cams or eccentrics are fixed, is turned by means of a lever, each eccentric operates in forcing the follower down. It is proposed sometimes to form teeth upon the cams, and on the friction rollers, in which case the lever may be applied to either of the friction rollers, instead of to the eccentric, as they will then operate as pinions.

The claim is to "the application of two or more eccentric cams, or pieces, to operate as above specified, thereby doubly increasing the distance of motion, without increasing the size of the eccentric pieces. And the right of attaching cogs to the eccentric cams or wheels, or on the rollers, or pinions."

Presses to work by eccentrics have been before patented, but the mode of applying two eccentrics in the manner here described we believe to be new. As no power will be gained by this arrangement, and it is more complex than a single eccentric, we do not perceive what advantage is offered by the proposed plan.

A good drawing accompanies the specification, but it is without written references.

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23. For a *Machine for Scouring Floors;* David Dickinson, Chatham, Middlesex county, Connecticut, October 1.

This *machine* is a contrivance for working a scrubbing brush backwards and forwards by a lever operating in the manner of a pump handle. A flat board is to stand upon the floor, and from this is to rise two uprights, to sustain the pin which is the fulcrum of the lever. To the lower end of this lever the scrubbing brush is to be attached by a joint. The board, with its appendages, is to be moved about the floor, that the brush may be applied to every part of it, &c. &c. &c.

We have seen many machines, some of them white, some yellow, and others black, which worked scrubbing brushes to admiration. Some of them were very clever looking articles, and, although unpatented, we should decidedly give them the preference, either for washing, scrubbing or other useful operations in domestic economy. They may be either hired, or purchased, as may be thought most convenient.

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24. For a *Churning Machine;* Philip Cornell, Brutus, Cayuga county, New York, October 1.

The churn is in the form of the common dasher churn. This is to be placed upon a platform which has an upright to sustain the machinery that is to work the dasher shaft. A crank is to be turned, which operates upon a wheel and pinion. To the shaft of the latter is attached a cast iron fly wheel, and a crank pin to raise and depress the dasher. There is no claim made, but we are told that this churn "is a great labour saving machine to all those who keep large dairies."

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25. For a *Rotary Steam Engine;* Ezekiel Childs, Philadelphia county, Pennsylvania, October 1.

In this engine the steam is to be admitted and discharged through the centre of the revolving shaft, in a way which has been frequently adopted. The steam, also, operates upon a piston revolving in an annular chamber precisely like several other rotary engines. The two valves which are to confine the steam, are sliding valves, which

operate very much like those of Galloway's engine, patented in England, but their whole structure, with the mode of working them, appears to be more perfect. We do not believe that this machine will be found equal to the ordinary reciprocating engine, although we think more favourably of it than of its predecessors. Those, however, who have read our lucubrations, are aware that we estimate rotary engines, generally, as very unpromising affairs. In choosing a model for the purpose of explaining the structure, or testing the power of a rotary engine, we have not seen one which we should prefer to that of Mr. Childs'.

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26. For an improvement in George Danforth's machine for *Making Cotton Roping*, called the "Counter Twisting Speeder," for which a patent was granted to said Danforth, dated the 2nd day of September, one thousand eight hundred and twenty-four; Joseph C. Dyer, a Citizen of the United States, but now residing at Manchester, in England, October 1.

The attempt would be vain to communicate any useful information respecting this machinery without several copper-plate engravings. Whether these will be furnished hereafter, must depend upon the patentee.

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27. For an improvement in the construction of a *Water Wheel for Propelling Machinery;* James Johnson, Fairbanks, Sullivan county, Indiana, October 1.

This is a wheel with hinged buckets or floats, but differently arranged from those which we have previously described. There is an axis carrying a solid hub, with spokes projecting from it, like the spokes of a carriage wheel. Each bucket consists of two pieces of plank, hinged to these spokes like shutters. The wheel is intended to be used in a current, and to be placed with its axis either vertically or horizontally. On one side of the axis, the current will tend to open the shutters, and expose their broad sides to its action, there being stops to prevent their opening beyond the point in which they both stand in the same plane. The opposite buckets will be closed by the current, and their edges only exposed to the water. The claim is to "the whole wheel above described, the shaft only excepted."

Hinged buckets have been tried in almost every possible variety of form, and have, hitherto, always disappointed the hopes of their projectors. The hinged buckets pass far beyond the point at which they *ought to open*, according to the opinions of those who construct them. We do not see any thing in the wheel now proposed which should give it a superiority over others of the same genus; but think it really inferior to several which have had an ephemeral existence; in this last particular we apprehend that the one under consideration will not shame its predecessors.

28. For an improvement in the *Art of Digging and Procuring Gold from the Mine*, by the use of a machine; Henry Jordan, Oglethorp county, Georgia, October 1.

A bolter, covered with wire work, receives the earth to be washed; this wire grating retains the stones, and larger masses, whilst the smaller pass through the meshes. These are received in a hollow cradle, sometimes called a rocker, forming about a quadrant of a cylinder, and which is placed immediately below the bolter. To this cradle a vibratory motion is given by means of a crank, whilst a stream of water is conducted upon its contents, to wash off the lighter particles, and leave those of the gold behind. From the rotary motion given to the bolter, the vibration of the cradle is derived.

There is no claim made, nor does the specification accord with the allegations in the petition. The machine has nothing to do with the "digging and procuring gold from the mine," but is merely intended to wash it after it has been so procured.

The business of separating and washing gold from the ore, although new in the United States, is old, both in Europe and in the southern part of our own continent. When those engaged in the business here have acquired a knowledge of the different plans which have been, and are, pursued in those countries, they will have arrived at the starting post in the race of improvement; until then, the chances will be against those who procure patents under the claim of being inventors; and when they are not invalidated, their main pillar will be the same want of information on the part of others. As regards the cradle, or hollow segment, used in the present instance, it is claimed in a patent previously granted, but when or where invented, it would be difficult to tell, as a very similar contrivance has been long known and used.

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29. For an improvement in the machine for *Cleaning Grain of every description*, called the "Fan Mill;" William C. Henley, Brookfield, Fairfield county, Connecticut, October 1.

(See specification.)

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30. For a *Rotary Propelling Engine;* John G. Hotchkiss, Cincinnati, Hamilton county, Ohio, October 1.

This *propelling engine*, as it is called, is intended to operate as a pump, or fire engine. It is of the rotary kind, with sliding valves fitting into mortises in a revolving shaft, which is enclosed within an eccentric cylindrical box. In its general principle there is no novelty, and as there is no claim to any part, we think it altogether unnecessary to give a particular description of it. We intend to prepare an article embracing several similar plans, with remarks upon their theoretical advantages, and practical defects.

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31. For a machine for *Washing the Wool on Sheep, or for washing it after it is shorn off, or for Washing Hats out of*

the Colour, also for the purpose of Washing Clothing; Charles Harris, Snow Hill, Clinton county, Ohio, October 1.

To wash sheep, a box capable of holding water is prepared; within this box two flutter, or dash wheels, are made to revolve: between these wheels the sheep is to stand, with his head out at an opening in the box, provided for that purpose. An open wire screen, or grating, on each side of the sheep, is to keep him from contact with the wheels. "The machine may be propelled by hand, by horse, steam, or water power." "The water is thrown by the motion of the wheels on the sheep with such velocity, that the wool will be immediately washed perfectly clean. In washing hats out of the colour, or clothing, a reel will be put between the grating, on which the article will be hung, that may require to be washed."

Thus endeth the specification, without any claim; but as we apprehend that this is the first machine of the kind used for this purpose, the whole may be considered as new.

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32. For rendering *Paper Hats Water Proof;* Benjamin Grut, City of New York, October 1.

This seems to us to be a strange kind of patent, as it is merely for rendering paper hats water proof by varnishing them with spirit, or oil varnish, such as sandarach, mastic, and copal; or caoutchouc, dissolved in naptha. The hats, it is said, may be primed with gum, glue, size, or isinglass, and coloured with any kind of pigment.

If a patent for this process can be sustained, we know not any thing which may not be securely patented. Paper hats, varnished, are among our early recollections, almost half a century ago. But the hats then made are all worn out, and have passed away, whilst those which the present patentee makes, are new.

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33. For a mode of *Combining the Power of the Lever and the Pulley, in the Standing Press;* George W. Grater, Boston, Massachusetts, and assigned to Lemuel Blake, of the same place, October 1.

(See specification.)

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34. For a *Spiral Axle,* to be applied to clocks or time pieces generally; Abijah Gould, Henrietta, Monroe county, New York, October 1.

This is another patent in which nothing is claimed. It is really astonishing that a patent should now be taken for what has been known as long as wheels and pinions have been in use, or somewhere there about. The spiral axle is merely the endless screw, and we are told that it may be made "in the form of a common wood or iron screw, or in the form of a common cork screw," and that it is to match in the teeth or cogs of a wheel. If this be new, Solomon was mistaken, and we also have been mistaken in supposing him to have been a wise man.

35. For a *Perennial, or Self-supplying Fountain Pen*, for writing with ink; Marcus T. C. Gould, City of Philadelphia, October 1.

(See specification.)

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36. For an improvement in the mode of *Separating Gold, and other Precious Metals, from the earthy substances with which they are combined;* Roswell King, M'Intosh county, Georgia, October 1.

A cylinder made of wood, or metal, four feet in diameter, and ten feet in height, is placed vertically, and has a piston and dasher, much like those of a common churn, and which is to be made to work up and down in the same manner, by any sufficient power. On the outside of this cylinder is placed a tube, which extends from the top of it to the bottom. This tube is for the purpose of conveying the earth to be washed, into the cylinder, below the dasher; it is, therefore, left open at its upper end, and at its lower, communicates with the inside of the cylinder. When water, and the earth to be washed, are put into the cylinder, the dasher is worked, the muddy water produced is to be let off from openings at different heights in the cylinder, and the gold, which, from its gravity, will settle to the bottom, is to be removed, either alone, or combined with quicksilver, and in mixture with the heavier materials.

The claim is to the mode of separating gold, by means of the above described machine.

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37. For an improvement in the mode of *Separating Gold, and other Precious Metals, from the earths and stones with which they are often found combined*, called "Vibrating Cylindrical and Circular Troughs;" Roswell King, M'Intosh county, Georgia, October 1.

This machinery consists of a trough which is a longitudinal segment of a cylinder, of about 10 feet in length, and 3 in diameter, and of a circular trough, of about 5 feet in diameter, and 6 inches deep, with their appurtenances.

The cylindrical trough, or cradle, is made to incline a little towards one end, and it is separated into compartments, by several partitions, reaching across it, but, (we suppose,) leaving an open space between their lower edges and the trough. The earth to be washed is put, with water, into the upper division, and a vibratory motion is given to the trough; or the contents are agitated by means of a vibrating bar placed above the trough, from which dashers project down between each of the divisions. The earth is thus to be washed off, and the gold collected at the lower end of the trough. The circular vibrating trough is sometimes added to the cylindrical one, and is used to receive the materials which have been partially washed in the cylindrical trough; it then completes the operation. This trough is placed horizontally, with an iron axle in its centre; a vibra-

tory motion is to be given to it by means of a crank, and the waste matter runs off at a spout, or an opening in its rim. The invention claimed, is the before described mode of separating gold, &c. and the machinery by which it is accomplished.

We need not here repeat the observations made on No. 28, but think that they apply to each of the machines described.

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38. For a *Machine for Mortising and Tenoning;* Elisha Mudge, Brookville, Genesee county, New York, October 1.

The mortising machine is intended, principally, for the hubs of wheels, but it may be used for other purposes. A stout frame is made, on the sills of which there is a sliding piece hollowed out to contain the hub to be mortised, and having attached to it screws for confining the hub in its place, and a graduated circular gauge, for laying off the mortises. At the upper part of the frame is a crank for working the mortise chisel, and another for turning an auger to bore a hole in the hub, to allow the chisel to begin its work. The tenons of the spokes are formed by a notched chisel, which cuts a shoulder on each side, and which is worked up and down by a lever.

There is not any particular part designated as the invention of the patentee, but he has taken the machine as a whole, and, as such, claims it as new in the following terms: "I have never seen, heard, or read, of a like invention. I think I may claim this as exclusively my own, without fear of contradiction."

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39. For an improvement in the *Stock and Hand Vice;* Enoch D. M'Cord, Sandy Hill, Washington county, New York, October 1.

(See specification.)

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40. For an improvement in the *Bar Share Plough;* Adam Mitchell, Jonesboro, Washington county, Tennessee, October 1.

In the description of this plough, we are informed of the curvature given to the mould board, and how it is braced, and attached to the beams; but it claims nothing. From an examination of the specification and drawing, we think that in this omission the patentee has done well; for had he claimed any particular part, its resemblance to other ploughs would have been rendered obvious, whilst under the present plan we are occupied in seeking for some latent novelty.

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41. For an improvement in the mode of *Making the Single Twist Auger,* and the mould and machinery by which the same is made; Ezra L'Hommedieu, Saybrook, Middlesex county, Connecticut, October 1.

This patent is taken for a method of twisting the spiral of the patent single twist auger, now so generally used by ship builders,

and others. The patentee says, "the operation of making the twist by winding, and the mould and machinery applied for that purpose, are what I claim to have invented. The only mode of making this kind of auger, previous to my invention, being by swedging out the spiral turns with dies from a round piece, in the form of a bolt."

The drawing which accompanies the specification gives a very perfect view of the apparatus used, which will, undoubtedly, answer the purpose intended.

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42. For *Manufacturing Soap, by means of Steam;* John Kennedy, Baltimore, Maryland, October 1.

The claim of the patentee will show, clearly, the object of the invention; it is in the following words.

"I do not claim as my invention the application of steam to the heating of liquids, or other materials contained in a wooden vat, or other vessel, this having been long known and used for various purposes; nor do I claim the foregoing modification of the apparatus for so doing, there being nothing new in the principle of its action; but what I claim is the application of steam to the manufacturing of soap, by conducting it into, or through, the vessels in which the materials are contained; this being, as I verily believe, originally discovered by me."

A patent for a similar purpose was granted to Messrs. Zell and Doyle, of Baltimore, on the 19th of July, as mentioned in our last number, p. 300. Mr. Kennedy, however, claims to have made the invention at a date prior to that of those gentlemen, and we believe that the respective claims of the parties are now the subject of litigation.

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43. For an improvement in the *Distillation of Grain into Whiskey, of which Indian Corn is the principal ingredient;* Dan Samson, Perrysburgh, Cataraugus county, New York, October 1.

The patentee gives directions respecting the quantities of the different kinds of meal, and of water, that are to be mixed together; the degree of heat to be given to the mixture, and the time which should elapse in the different intervals; but after being very definite, he gives great latitude; which, as his patent is based upon these particulars, appears to render the whole unstable. We will give one example, as a specimen of the whole. "Then stir the mash well, and cover the tub, and let it stand one hour; the time, however, may be varied from $\frac{3}{4}$ to 3 hours." After this he claims "the quantity and heat of water mentioned." "The length of time the mash stands from the time the corn meal is put in, before the rye meal and malt are put in. The length of time the beer stands before running. The small quantity of English grain to the corn," &c. &c.

[TO BE CONTINUED.]

Specification of a patent for a new mode of combining the power of the Lever and the Pulley, in the Standing Press. Granted to George W. Grater, *of Boston, Massachusetts, October* 1, 1830, *and assigned by him to* Lemuel Blake, *of the same place.*

To all whom it may concern, be it known, that I, George W. Grater, of Boston, in the state of Massachusetts, have invented a new mode of combining the powers of the lever and the pulley, in the standing press, for pressing articles of various kinds; which press is intended to be used as a substitute for the ordinary lever, screw, and hydrostatic presses; and that the following is a full and exact description of the same.

I make a strong frame, which may consist of cheeks, properly united by cross pieces, with mortises and bolts, in the manner common in screw presses; or, instead of cheeks, I use four strong corner posts, mortised into sills, and having such cap and cross pieces, or ties, framed into them, as may be deemed necessary. This latter mode I prefer, and it is the one which is represented in the drawing deposited in the patent office. The bed of the press I usually place near the upper part of the frame, or cheeks, bolting, and otherwise securing it firmly thereto; the follower being suspended below, by the tackle, in the manner to be presently described.

Across the top of the frame, or cheeks, and extending from side to side, I affix a strong iron axle, turning upon gudgeons, in suitable boxes; upon this axle, and usually near its middle, I place an iron toothed wheel, and on each side of this wheel, cylindrical pieces of wood, or other material, around which the rope to be used is to wind in the operation of the press. A second axle is placed parallel to the former, having upon it a pinion or small toothed wheel, which takes into the former; there is also fixed upon this axle, a round block, or hub, with mortise holes, to receive the end of the lever, or hand spike, which is to operate upon this compound windlass. Ratchets and palls are employed in the usual manner. At each end of the bed, and of the follower, and attached thereto, I place two, three, or more sheeves, or pulleys; the ends being notched out to receive them, and a bolt upon which they are to turn, passing through, or on one side of the bed and follower. For the purpose of obtaining the greatest strength, it will be best to secure these bolts, by staples, on the upper side of the bed, and on the lower side of the follower, instead of passing them through their substance.

The press, as before described, is now ready for the reeving of the rope, which is thus effected. A single rope is taken and passed under the follower towards the back part thereof, the two ends being brought up through openings left in the ends of the follower for that purpose; they are then passed over the two back pulleys of the bed, and under the two of the follower, and successively around the re-

maining pulleys, until they pass up from the last pulley on the front of the follower; the two ends are now secured, one on each of the cylindrical pieces of the first named axis, when the press is ready for use. In order to preserve an equal tension in the rope, that part of it which passes under the bed is sustained by friction rollers.

The operation of the press is now manifest, as it is similar in principle to that of an ordinary tackle, operated upon by a windlass.

In order to sustain any part of the articles in press at any required height, holes are bored through the cheeks, or uprights, into which rods, or pins, may be inserted, so that any part may be taken out and renewed without taking out the whole.

If it be thought best to have the bed below, and the follower above, this may be effected by reversing the whole arrangement; but in this case the weight of the follower and of its appendages, must be counterpoised, by extending a rope from each end of it, passing over a pulley above, and so loaded as to sustain it in its place.

Presses operated on by means of a windlass and tackle, have been heretofore made, but they have been inconvenient in use, in consequence of the arrangement of the parts. I do not, therefore, claim a lever and tackle press, generally, but what I claim as constituting my invention, is the manner in which the rope is reeved over the pulleys attached to the bed and follower, as described in the foregoing specification.

It will be obvious that where continued pressure is required, a weight may be allowed to remain suspended upon the end of the lever, which added to the elasticity of the ropes, will produce a powerful continued effect. It may likewise be observed that chains may, in certain cases, be substituted for the rope.

GEORGE W. GRATER.

Specification of a patent for a machine for Flattening Cylinder Window Glass. Granted to WILLIAM COFFAN, Jr. *Hammonton, Gloucester county, New Jersey, October* 1.

BE it known, that I, William Coffan, jr. have invented a new and useful improvement in the machine for flattening cylinder window glass, and that the following is a full and exact description of the construction and operation of the said machine as invented by me. The present mode of flattening glass, is, by having two stationary stones, one in the flattening oven, on which the glass is flattened out from the cylinder form, and then is passed, by sliding over the surface of this stone, on the other stationary stone, which is in the annealing, or cooling oven, through a small crevice under the partition wall which separates the two ovens, about half an inch above the surface of the two stones, which are joined together underneath this partition wall, and then the glass is raised up from the stone in the cooling oven, after sufficiently cooled, and stacked away.

What I claim as new, and as my own invention or discovery, is an improvement made in the above described machinery, and for the use

of which I ask an exclusive privilege. This consists in having a circular table, or wheel, with the stones for flattening and cooling placed upon both sides, on the top, or to cover the whole surface; and to carry the glass upon it when flattened, by revolving horizontally upon its centre, to the cooling, or annealing oven; to be supported and worked by proper machinery for that purpose, instead of having the two stones permanently fixed, one in each oven, and the glass shoved, or pushed, over the surface of the stones from the one in the flattening oven, to the other in the cooling oven.

The centre of this horizontal wheel, or table, is to be under the partition wall which divides the two ovens, at a distance above the top of the wheel, or table, sufficient to pass the glass under, so that the glass placed upon, and flattened on the stone, on the half of the wheel, or table, in the flattening oven, may be carried around upon this table which revolves on its centre, under the said wall, to the cooling oven, without taking it from the stone until it arrives in the cooling oven, and then, when sufficiently cool, to be placed away; at the time the wheel, or table, is stopped revolving, and the glass upon it is cooling and taken off in the cooling oven, after having been conveyed upon it, from the flattening oven, another cylinder can be flattened on the stone on the other half of the wheel, or table, that has passed by its revolution from the cooling to the flattening oven.

By this operation it does not require that the glass should be removed from the stone upon which it is flattened, which preserves the polish, and prevents the surface of the glass from being scratched, which is the case when it is pushed over the surface of the stones, from the one to the other. It also differs from the other mode, in this, that by the revolving of this wheel, or table, the stones are both made flattening, and both cooling stones, or the whole wheel, or table, is both a flattening and cooling stone. WILLIAM COFFAN, Jr.

Specification of a patent for a Rail-road Car. Granted to JOHN ELGAR, *of Baltimore, Maryland, October* 1, 1830.

To obtain a form and combination of substances that will reduce the friction in the rubbing parts of a rail-way car, to its lowest point, where the "friction wheels" are not used, I adopt the admirable plan of outside journals, introduced and patented by R. Winans. The essential advantage of which, is, that the journals are reduced one-third in diameter (of course the friction is equally reduced) still preserving the full size and strength of the axles between the wheels. The axles extend through the wheels, about 4½ inches, are steeled, and turned to 2 inches diameter, and hardened, which forms the journal. To this journal I adapt a bearing, or box of cast iron, either in two pieces, or one entire piece; and to obtain an opening in the box that shall at once combine a proper shape to fit the journal, with a smooth and excessively hard surface, it is cast upon a "chill," or piece of iron dressed to the size of the journal, but with three ribs upon it, running lengthwise, which divides the circular

opening of the box into three parts, and reduces the bearing on the journal to one-fourth of its circumference. In the contact of substances so hard, this quantity of surface is sufficient, and the friction is less.

The back part of the box is at the same time *chilled*, for the purpose of receiving against it the steel centre point of the journal, that the tendency to lateral motion may be governed, without the friction consequent upon shoulders. To exclude dust, and confine the oil, I use a packing plate, similar to that which is used at the piston stem of the steam engine. This plate passes on the journal in front of the box, and is screwed up to the latter, with packing of hemp, leather, or cork.

The side, or face of the plate toward the wheel, has a projecting flanch upon it, which embraces the hub and excludes the dirt.

The box will perhaps contain one half gill of oil beside the journal, which insures a perfect lubrication of the latter.

The improvement that I claim as my invention, is the chilled, cast iron box, combined with the *steeled*, centre pointed journal; the peculiar form of the inside of the box, which reduces the surface of the bearing, and the packing plate. JOHN ELGAR.

Specification of a patent for an improvement in the construction and application of Friction Rollers. Granted to DAVID BALDWIN, *of Queensbury, in the county of Warren, and state of New York, October* 1, 1830.

THE friction rollers which have hitherto been applied to the gudgeons of heavy wheels, or to the axles of carriages, have generally been constructed as follows. A number of cylindrical rollers of cast iron or brass, are connected to a flat ring at each end, by an arbour passing through each roller being rivetted to these rings. The rollers are then fitted to a hollow cylindrical metallic box, the inside of which is smoothly finished, so that the rollers may roll freely around its internal surface: a cap is then fitted to each end to keep the rollers in their place; perforations being left sufficiently large to permit the rings to which the rollers are rivetted to revolve freely within them. This box of rollers is then put upon the axle, or gudgeon for which it is intended. The objection to using rollers thus constructed, is, that it is difficult to tighten them when worn; which will soon happen if used in heavy work. To obviate this difficulty is one of the principal objects of the present improvement.

My improved rollers are constructed in the following manner. The middle portion of each roller is cylindrical, but the two ends are in the form of the lower fructrum of a cone, with the bases applied to the cylindrical portion, and of the same diameter. The rollers are connected to each other by a ring at each end in the common method. The box in which they run is shaped on the inside to correspond with the shape of the rollers. The straight, or cylindrical part of them, however, is not permitted to touch the inside surface

of the box, a slight enlargement being made therein for that purpose. The rollers then touch the box only on the slant side of their conical ends, and it will readily be perceived that if they wear, they can be tightened, if the upper and lower parts of the box can be brought nearer together, and that this may be done, I construct the box in the following manner. In the first place, let the box be made a perfect hollow cylinder, as in the old method, a little larger than is necessary to receive the rollers which must be placed within it. There will then be a space between the tapering ends of the rollers and the inside of the box, which must be filled up. Let a casting be made to fill this cavity, and fitted so that it may be put in and taken out at pleasure; and from around the upward portion of this casting, let a circular flanch project outwards, so that its outward edge may correspond with the outside of the cylinder, and its bottom may be brought in contact with the cylinder's upper surface. (The terms upper and lower are here employed with reference to the position of the box when used for a grist mill spindle, or any other perpendicular shaft.) Let two screws pass through this flanch into the cylindrical box, which is tapped for their reception opposite each other; that is, one screw on each end of a diameter of the cylinder. Let another diameter be drawn at right angles with the first, and at each end place another screw, the female part of which is within the flanch, and its blunt end pressing upon the edge of the box. The first mentioned screws will draw the two nearer together, and the others will separate them, so that by these screws they may be made loose, or tight, at pleasure. Connected with this flanch, and in the same place, another flanch projects inwards as far as may be, without interfering with the rings to which the rollers are fastened, the object of which is merely to keep the rollers steady. Both ends of the box may be fitted in the manner above described; or the lower portion of the box may be made to fit the taper of the rollers. A flat ring screwed to the bottom as above described, with an elevation from its lower surface for the rollers to rest upon, will serve to raise or lower them, as may be required. The rollers and boxes may be made of any metal sufficiently hard, whether cast or wrought, but for heavy work, I prefer cast iron.

Another improvement which I believe to be new and useful, is the application of friction rollers to the spindles of grist mills. It is well known that it is somewhat difficult to bush a spindle properly. If made too loose, it will not run steadily; if too tight, it will soon heat. My method of applying the rollers to the spindle, is simply to fit them accurately to it, and to wedge the box which contains them, into the eye of the lower stone. The grain is kept from falling into the box by a leather collar fitted to the spindle, as has been formerly practiced.

What I claim is the making of a portion of each end of the rollers tapering, that they may be tightened, as above described; and the application of friction rollers to the spindles of grist mills.

DAVID BALDWIN.

Description of the Section.

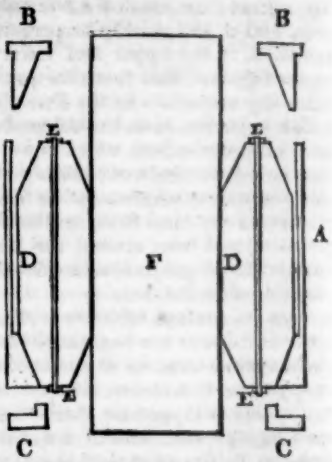
A, A, section of the hollow cylindrical box to receive the rollers.

B, B, a short cylinder, the outside of which will fit the inside of the box A, and the inside just receive the tapering ends of the rollers.

C, C, the bottom of the box A, A, attached by screws in the same manner with the upper portions A B, B.

D, D, sections of two of the rollers, the gudgeons of which are rivetted to the rings at E, E, E, E.

F, a spindle within the rollers.



Specification of a patent for an improvement in the machine for cleaning wheat of every description, commonly called the Wheat Fan. Granted to WILLIAM C. HAWLEY, *Brookfield, Fairfield county, Connecticut, October* 1, 1830.

BE it known, that my improvement in the wheat fan is as follows. Beneath the hopper into which the grain, or other seeds, are put, for the purpose of being operated upon by the machine, is placed a revolving cloth, or apron; the *cloth* (so called) may be made of leather, canvass, or other suitable material; and, of itself, forms the bottom of said hopper, upon which the seeds, or grain, may rest. Upon one of the rollers around which the cloth passes, and upon the end of said roller, is fixed a pulley, or band wheel, of eighteen inches diameter, more or less. Upon the end of the same roller is fixed the crank by which the machine is put in motion. A pulley is also fixed upon one end of the fan wheel's shaft, of six inches diameter, more or less, from which a band passes to, and around the eighteen inch pulley before mentioned.

Thus, by turning the crank, the fan wheel is put in motion, and also the revolving cloth by which the seed, or grain, is drawn from the hopper and precipitated upon the seives, or riddle; the machine being made like most fan mills now in use, with the exception of the revolving cloth, &c. as above specified.

That which I claim as my invention and improvement, is, the application of the revolving cloth as above specified, for the within mentioned purposes. WILLIAM C. HAWLEY.

Specification of a patent for a Perennial Fountain Pen. Granted to MARCUS T. C. GOULD, *Stenographer, of the City of Philadelphia, October* 1, 1830.

BE it known, that I, Marcus T. C. Gould, of the city and county of Philadelphia, and state of Pennsylvania, have made a new and useful improvement in a pen for writing with ink, called the Perennial, or Self-supplying Fountain Pen; and that the following is a full and exact description of its parts, construction and use, viz.

1st. A cylindrical barrel, of gold, silver, glass, or other material, about five inches in length, and one-third of an inch in diameter, to be filled with ink.

2nd. A shaft of metal or other substance, screwed into the lower end of the barrel, and projecting downward, below it, about half an inch, and forming in its diminished size, a collet, upon which is slid a common, or metallic pen.

3d. A small tube, or conductor, of gold, silver, or other material, passing upward through the collet, and communicating with the column of ink, by means of a regulator, hereafter described; and at the same time extending downwards, along the centre of the pen, with the lower end so bent as to open directly upon the split of the pen.

4th. A hollow wire, or rod, called the regulator, passing through the upper end of the barrel, and extending downwards through the barrel and shaft till it meets the ink tube, about midway of the shaft and collet. This regulator has a small groove, or other opening, near each end (and within the fastening or packing box, at each end of the barrel) for the purpose of admitting, when unscrewed, ink below and air above—that is, ink into the tube and air into the barrel; and at the same time opening an uninterrupted channel through the whole length of the instrument; through which, if the regulator be screwed down, and opened above, air, or water, may be forced for the purpose of cleansing the tube, and that, without communicating with the ink in the barrel.

5th. A piece of sponge, or other porous substance, attached to the wire immediately above the shaft, and filling the entire diameter of the barrel, about ¼ of an inch upward, thus forming, when the regulator is unscrewed and the pen in use, a strainer of the ink, and a regulator of its flowing; or, when screwed down, and the pen at rest, a general valve upon which the whole column of ink may rest. Immediately above this spongy substance, is attached to the rod, a thin, flat circular plate, or follower, equal in width to the inner diameter of the barrel; this plate should be finely perforated in various places near its circumference.

6th. A small stopper, at the upper end of the regulator, and a suitable cap at each end of the barrel, to give a finish to the whole, completes the instrument.

Remarks upon the construction and use.

The regulator should be so adjusted as to open or close the air vent and ink valve, simultaneously; and, if preferred, the object may be effected by a pressure of the finger, or thumb, when writing, upon a spring near the lower end of the barrel, instead of turning a screw, or regulator, at the top, as above described.

The ink tube should not perfectly coincide with the axis of the collet, but incline a little towards the circumference at the lower end, so that by turning the pen and conductor, (or ink tube,) a greater or less pressure may be produced between the two, at their junction.

The collet should be of sufficient length to allow of sliding the pen, so as to bring the nib nearer to, or farther from, the mouth of the tube, when it shall be desirable to make the ink flow faster or slower.

If these several points be attended to, the instrument will be regulated in four separate and distinct methods; and when charged, will supply itself for hours together, as fast as may be desired by the writer, whether writing slowly or rapidly; for the opening and closing of the split of the pen, when in use, will cause the ink to flow in exact proportion to the number of motions produced; and when the pen ceases to move, the ink will cease to flow.

The improvements claimed are these, viz.

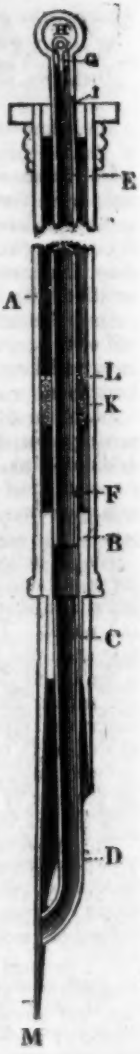
1st. Conducting ink from a reservoir, or fountain, directly to the split of the pen, through a tube opening upon the concave surface of the pen.

2nd. Straining the ink from impurities, and regulating its flowing by a spongy or porous substance within and at the bottom of the barrel.

3d. The method of opening and closing the ink tube and air vent.

4th. The provision for clearing the ink tube, when clogged.

MARCUS T. C. GOULD.



References to the drawing of the section of the pen.

A, cylinder barrel. B, shaft. C, collet. D, small tube or conductor. E, regulator. F, opening to admit ink to the regulator. G, opening for air. H, stopper to the opening. I, Groove to admit air to the barrel. K, piece of sponge. L, follower. M, nib of the pen.

Specification of a patent for an improvement in the manufacture of Wheels, Pinions, or Movements, to be employed in the construction of Clocks, Time-pieces, or other machinery. Granted to JOHN P. BAKEWELL, *Pittsburgh, Alleghany county, Pennsylvania, October 1, 1830.*

THE said improvement consists in making the said, wheels, pinions, or movements, of GLASS, instead of the substances or materials which have been heretofore employed for that purpose. Which object may be obtained by forcibly compressing a proper quantity of melted glass between moulds or dies, in which an indentation, or cavity, has been made of the form and size which is intended to be given to the wheel, pinion, or movement, in such a manner that the said wheels, pinions, or movements, shall be formed with the requisite number of teeth, cogs, or leaves, and shall require little, if any dressing off, to fit them for use.

The holes by means of which the arbors, or axles, and the various springs, pins, &c. are intended to be attached to the said wheels, pinions, or movements, may either be made by corresponding cores, or piercers, of the required shape and size, placed within the moulds or dies, or they may be drilled through the said wheels, pinions, or movements, after the glass is cold.

It is to be observed, that in some cases it may be more economical and convenient to make the wheel and pinion in one piece, with a hole through the centre for the arbor or axis, which may be done by constructing the moulds, or dies, accordingly. And that the said, wheels, pinions, or movements, may either be used alone, or combined with others made of any of the materials heretofore employed for that purpose.

As no claim is made to any particular construction of moulds, or dies, it is considered unnecessary to describe them minutely; but any person who has been accustomed to construct the moulds or dies which are used for the purpose of making glass plates, &c. by pressure, can readily construct such as would answer for making glass wheels, pinions, or movements. And as the relative size of the wheels, pinions, or movements, and the number of teeth, cogs, or wheels in each, must depend upon the judgment of the clockmaker or machinist, no specific size can be designated, and the claim is therefore for making wheels and pinions, or movements of glass, of any size, and with any number of teeth, cogs, or leaves, and applying the same to the construction of clocks, time-pieces, or other machinery, either alone, or combined with others made of any of the materials which have been heretofore employed for that purpose.

JOHN P. BAKEWELL.

Specification of a patent for an improvement in the method of Saccharifying Rye, and other kinds of Grain; the Sweet, and common Potato, and other Vegetable Substances containing Fecula. Granted to AMABLE J. BRASIER, *of the city of Philadelphia, Oct.* 1, 1830.

INTO any convenient vessel, (which, however, must be made of materials on which diluted sulphuric acid cannot act injuriously,) I put one hundred parts of either of the above named substances, with from one to three hundred parts of water, acidulated with from two to four parts of sulphuric acid, I then bring the whole to the boiling point, which heat I maintain during the whole time of the operation. The heated water first converts the fecula contained in the substance employed into a mucilage, which is afterwards liquefied by the action of the acid, which, by keeping the liquid in a state of fluidity favours the saccharification.

When the substance employed is finely divided, the heated water acting upon the whole of the fecula at once, the quantity of mucilage formed, thickens the mass very much; I, therefore, when I use but little water, do not add the whole of the substance, but keep a part to add in portions when the mass is liquefied. I also usually agitate the mass to facilitate the liquefaction.

When the substance is not finely divided, the action of the heated water on the fecula being slower, the mucilage is partly liquefied as soon as formed, the mass not being thickened as in the first case, I add the whole of the substance at first; I also agitate it, but it is to divide, or the better to crush it, as the action of the heat and acidulated water soften it.

I regulate the quantity of water to be used according to the state of concentration in which I wish to obtain the sirop, and if the heating is effected by introducing steam into the mass, a quantity of water equal to that formed by its condensation should be deducted from the original quantity.

The time required for the operation varies very much, as it depends upon the nature and state of the substances acted upon; the more compact and coarse it is, and the more sparingly the acid is used, the longer period will be required; even more than four days; while, on the contrary, it may be completed in less than six hours, if the acid is used profusely, and the substance acted upon is porous or subdivided; I only give the above as a guide, for I always ascertain its termination by the tincture of iodine no longer giving a blue or purple colour to the liquid, as is the case so long as any portion of the fecula remains unsaccharified.

I then neutralize the acid with lime, or a carbonate of lime, and separate, if required, by filtering, or any other means, the sirop from the sediment.

The sirop thus obtained may be afterwards evaporated, fermented, or applied in any way which may be found convenient.

Since I have made the above improvement, I have ascertained that the common potato had already been used for the above pur-

pose, but it was first reduced to a pulp, and afterwards so treated as to require considerable labour; but I have discovered that the saccharification of the potato can be effected by exposing it whole to the combined action of heat, and of acidulated water. So far as the common potato is concerned, therefore, I limit my claim to saccharifying it without first reducing it to a pulp.

What I further claim as new, and as my invention and discovery, is the saccharification, by the combined action of heat, and water acidulated by sulphuric acid, of the fecula of the substances already referred to, without separating it from their other principles, by whatever variation of the within recited process the same may be effected.

A. J. BRASIER.

Specification of a patent for an improvement in the mode of Saccharifying Rice and Maize, (Indian Corn.) Granted to AMABLE J. BRASIER, *of the City of Philadelphia, October* 1, 1830.

INTO any convenient vessel, (which must, however, be made of materials on which diluted sulphuric acid cannot act injuriously,) I put one hundred parts of rice, or of maize, either in their natural states, or in that of flour, or meal, with from one to three hundred parts of water acidulated with from two to four parts of sulphuric acid. I then bring the whole to the boiling point, which heat I maintain during the whole time of the operation; the heated water first converts the fecula contained in the substance employed into a mucilage, which is afterwards liquefied by the action of the acid, which, by keeping the liquid in a state of fluidity, favours the saccharification.

When the substance employed is finely divided, the heated water acting upon the whole of the fecula at once, the quantity of mucilage formed, thickens the mass very much; I, therefore, when I use but little water, do not add the whole of the substance at first, but keep a part to add, in portions, when the mass is liquefied; I also usually agitate the mass to facilitate its liquefaction.

When the substance is not finely divided, the action of the heated water on the fecula being slower, the mucilage is partly liquefied as soon as formed, the mass not being thickened as in the first case, I add the whole of the substance at first; I also agitate it, but it is to divide, or the better to crush it; as the action of the heat and acidulated water soften it.

I regulate the quantity of water to be used according to the state of concentration in which I wish to obtain the sirop, and, if the heating is effected by introducing steam into the mass, an equal quantity of water to that formed by its condensation should be deducted from the original quantity.

When the largest proportion of acid is used, corn, unbroken, is saccharified in about twenty-four hours, and its meal in about six. Rice, either whole, or in a state of flour, is also saccharified in about six hours. When, on the contrary, the smallest proportion of acid is used, it may require more than four days for corn unbroken, and

thirty-six hours for its meal. Twenty-four hours for rice, but, for its flour, about one-fourth of that time is sufficient. As the time given above may vary, I merely give it as a guide, for I always ascertain the termination of the operation, by the tincture of iodine no longer giving a blue or purple colour to the liquid, as is the case so long as any portion of the fecula remains unsaccharified.

I then neutralize the acid with lime, or a carbonate of lime, and separate, (if required,) by filtering, or any other means, the sirop from the sediment.

The sirop thus obtained may be afterwards evaporated, fermented, or applied in any way which may be found convenient.

What I claim as new, and as my invention and discovery, is the saccharification, by the combined action of heat, and water acidulated by sulphuric acid, of the fecula of rice and maize, without separating it from their other principles, by whatever variation of the within recited process the same may be effected.

A. J. BRASIER.

Specification of a patent for an improvement upon the Running Cap Spinner, which was patented on the 13th of June, 1829. *Granted to* JOHN THORP, *Providence, Rhode Island, November* 11, 1830.

(WITH A COPPER-PLATE.)

BE it known, that I, John Thorp, of Providence, in the county of Providence, and state of Rhode Island, &c. have invented, constructed, made, and applied to use, new and useful improvements in machinery for spinning, and in spinning cotton yarns, being improvements on my running cap spinner, patented on the 13th day of June, A. D. 1829, by which is produced a new mode of obstructing the revolving progress of the yarn, causing it to fall back of the cap, and wind upon the bobbin.

The spindle used is the common throstle spindle. Two projecting lips are affixed to that part of it where the bobbin usually traverses.

These lips are on opposite sides of the spindle, are parallel with it, and project about the sixteenth of an inch. They extend up no further than the base of the bobbin, when at its highest position, and there should be length enough to the spindle above them, to allow the bobbin to be raised above them, so as to turn on the spindle for the purpose of yielding the yarn for piecing, &c.

The common throstle flyer is converted into what I call a cap, by affixing to the lower extremity of its arms, in a horizontal position, a ring called the connecting ring, sufficiently large to allow the bobbin to traverse up and down through it. This ring guides the yarn to, and distributes it on, the bobbin. The yarn is not connected with the cap, but is left to revolve around its surface.

The bobbin used, is the common throstle bobbin, with a channel, or groove, formed on each side of its perforation, in which the above

described lips of the spindle traverse, and by which the bobbin is made to turn with the spindle. Or, there may be to each spindle, a tube of the length of the bobbin, in which the said channels, or grooves, may be formed, having a large head, or collar, at the bottom, on which the bobbin will loosely set. This tube may be made of sheet iron, and not entirely closed, and brazed to a head, or collar, of the same. In this case, the opening in the side of the tube, will answer for one channel, or groove, and the other channel, or groove, and one of the lips on the spindle may be dispensed with. The friction of the base of the bobbin on this head, or collar, will be sufficient to give motion to the bobbin; and the bobbin being allowed to turn on said tube, will at any time yield the yarn when it is necessary that it should be drawn from it, as in piecing the ends, &c. Or, instead of said lips, on the spindle, grooves, or channels, may be made in it, and a collar used to give motion to the bobbin. This collar should be about the size of the base of the bobbin, and made to slide loosely on the spindle. From the sides of its perforation, two lips project inward, and into the channels, or grooves, in the spindle, causing the collar to turn with the spindle.

But the principal improvement consists in a stationary spiral lip, or rim, that I call the check. The upper edge of the check is within the connecting ring. One end, or part of this check, is placed and remains above this ring, while the other end remains below it. The space between the inside of this ring and the outside of the check, should be large enough to allow the yarn to revolve freely in it.

The friction, or tension, requisite to wind the yarn upon the bobbin, is produced by the upper edge of the check over which the yarn is drawn, or compelled to pass at every turn of the spindle. The check is a thin piece of metal, bent flatwise, forming a curve corresponding with a circle less in diameter than that of the ring. It is fastened to a knee that is bolted, or otherwise fastened, to a fixed bar, or rail, that stretches along the spinning frame, back of the spindle. By means of a slot, or mortise, in said knee, the check can be raised or lowered at pleasure, carrying its upper edge more or less above the bottom of the connecting ring, and producing more or less angle in the yarn; consequently, increasing or diminishing the friction, or tension of the yarn, and winding it more or less tight on the bobbin. Said check should extend half way round the bobbin, though a greater or less proportion may answer the purpose.

Small polished notches, or protuberances, on the upper edge of the check, will produce an increased tension on the yarn. The yarn passes down on the outside of the connecting ring, or lower edge of the cap, then up between said ring and the check, and over the upper edge of the check to the bobbin.

Among the several improvements above described, there is but one in which I claim an exclusive property, and that is, the check, as above described, by which the progress of the revolving yarn is obstructed, the yarn made to fall back of the cap, and to wind on the bobbin.

JOHN THORP.

References to the Plate of J. Thorp's improved Running Cap Spinner.

A, the spindle.
B, the cap.
C, the connecting ring.
D, the box that forms the upper bearing of the spindle.
E, the step in which the spindle stands.
F, the bobbin.
G, the head or collar on which the bobbin stands.
H, the tube on which the bobbin loosely turns.

I, I, the check, that obstructs the revolving progress of the yarn, causing it to fall back of the cap, and wind on upon the bobbin.

J, J, two lips on the spindle, formed by soldering two pieces of wire to it. They slide in the two channels formed in the bobbin or tube, causing the bobbin to turn with the spindle.

K, the whirl.

L, a collar that slides loosely on the spindle. From its perforation two lips project inward, and into the channels in the spindle, by which the collar is made to turn with the spindle. The bobbin sets on this collar, and the friction of its base on the collar gives motion to the bobbin. This collar, as well as the head or collar of the tube, H, sets on the vibrating rail or lifter of the common throstle frame, and moves with it to distribute the yarn on the bobbin.

M, M, one of the channels or grooves in the spindle. The other is directly opposite to it.

In altering spinning frames now in use, or those where the spindles are small, it would be better to use the lips, rather than the channels, as the latter would weaken them.

In building new spinning frames, the spindles can be made enough larger for that purpose. They both work equally well. The yarn is represented as passing through the loop above the spindle.

Fig. 3, represents the check. This will answer a good purpose in making cotton roving, &c.

Specification of a patent for an improvement in the Stock and Hand Vice. Granted to Enoch D. M'Cord, *of the Village of Sandy Hill, in the county of Washington, New York, October* 1, 1830.

In the vices which have been heretofore in common use, the washer between the head of the screw and the front stock, and that portion of the pipe box which comes in contact with the back stock, have merely plane surfaces, at right angles with the axis of the screw, which press upon corresponding surfaces upon the two stocks. When the vice is closed, they are in perfect contact; when it is open they are not. When a common blacksmith's vice is opened four or five inches, no part of the washer touches the stock, but its upper edge; when, therefore, an attempt is made to secure any large body in it, it cannot be held as firmly as a small one, and the screw is in dan-

Fig. 1.

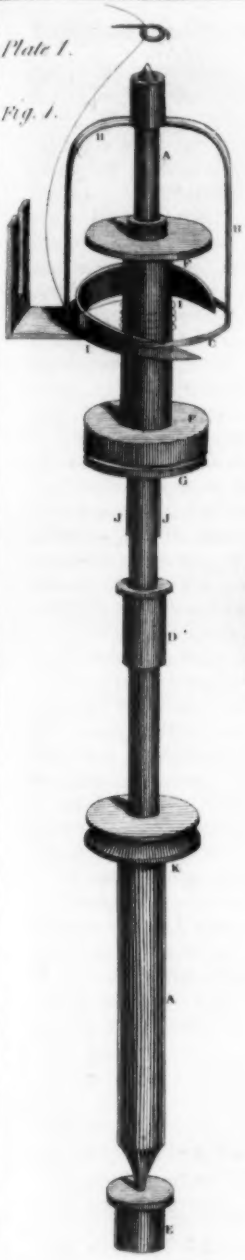
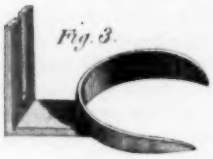


Fig. 2.

Fig. 3.



Drawings of John Thorp's Improvements on his Running Cap Spinner.

ger of being broken. To obviate this difficulty is one of the principal objects of the present improvement.

To effect this, the washer to be used under the head of the screw, and the front end of the pipe box, I make in the form of a segment of a globe, perforated in the centre for the reception of the screw; a cavity to correspond is made in the outside of each stock, at the place through which the screw passes, and fitted so as accurately to receive one of these spherical segments, and thus form a segment of the ordinary ball and socket joint, which will adapt itself to any position of the jaws of the vice. They may then be pressed together with equal firmness, whether a large or a small body is between them, and the screw is not more liable to be broken in one case than in the other. As the stocks of vices in general have no lateral movement, it is apparent that a joint to answer all the purposes desired may be constructed in the form of any regular solid of revolution, or any segment thereof, made parallel to its axis, or coinciding with it; but a spherical segment not exceeding half a sphere, I prefer to any other shape, as the cavities can all be fitted with drills, and less of the substance of the stock will be removed in fitting. It is equally obvious that in constructing this joint, it is not material to have its concave portion upon the stock of the vice, as the principle and operation will be the same if the order be inverted, that is, the washer and pipe made concave, and the stocks convex.

As it is my intention to make most of these vices of cast iron; I have made another improvement, which is, however, equally applicable to cast iron or wrought. It consists in making the face of the jaws of other and harder materials. A plate of steel with suitable teeth cut in it, is screwed to the inside of each jaw, the bottom resting on a shoulder in the stock; or the same plate may be made to constitute the inner portion of a band, driven around the upper end of each stock. When it is wished to avoid the expense of steel jaws in the manufacturing of cast iron vices, the jaws may be chill hardened when they are cast.

What I claim, is the giving such a form to the washers, or to the bearings of the screw and pipe against the stocks of the vice, as shall enable them to adapt themselves thereto, whether the vice be opened or closed; the same being effected on the principles herein described. I also claim the application of steel to form the jaws of cast iron vices, whether the steel be secured to the iron by screws, rivets, bands, or otherwise. ENOCH D. M'CORD.

ENGLISH PATENTS.

To JOHN YATES, *Calico Printer, for a method or process of giving a metallic surface to Cotton, Silk, Linen, and other fabrics.* Dated January 26, 1830.

I, THE said John Yates, do hereby declare, that my said invention consists in applying a metallic surface to cotton, linen, silk, and

other fabrics, by reducing the metal or metals employed to a state of powder, afterwards mixing that powder with some farinaceous paste or other mucilaginous or cohesive substance, such as glue or gum, to cause it to adhere to the cloth or fabric to which it is to be applied, and by subjecting the cloth, to which the powder has been applied, to a high degree of friction, in order to produce the bright or burnished appearance of metal, at much less expense than has been hitherto effected. And in further compliance with the said proviso, I, the said John Yates, do hereby declare, that the manner in which my said invention is to be performed, is set forth in the following description, (that is to say:—)

The metal I commonly use, is tin, as combining cheapness with brilliancy, and I dissolve it by means of a sand bath, in pure muriatic acid, of the specific gravity of 1.160, or thereabouts, until the quantity of acid used is saturated with the tin, which is always known when any portion of the latter continues in the vessel undissolved by the acid. This solution, so prepared and ready for use, I keep carefully made up in bottles, to prevent its absorbing oxygen; I then employ a vessel of wood, about five feet long, three feet wide, and one foot deep, along which I place, lengthwise, an iron centre, which runs on its own axis, and having supporters, on which centre I frame a cylinder of hoops of zinc or spelter, running the whole length of the vessel, each hoop being fourteen to twenty inches in diameter, about five or six inches wide, and one or two thick; the cylinder is so placed as to run about half an inch deep in the liquor used: I then fill the vessel with pure cold water, and the solution of tin before mentioned, in the proportion of one part of the solution to ten parts of water, and the cylinder is made to revolve slowly by the application of any moving power, so as continually to present a fresh surface to the liquor in the vessel. This process is continued, the tin appearing reformed or revived on the whole surface of the cylinder, by the combination of the zinc of the cylinder with the oxygen of the tin previously dissolved in the liquor, and consequent precipitation or revival of the tin, according to a principle well known and acted upon in chemical manufactories. The tin so reformed or revived is carefully scraped off by a wooden or metallic instrument, into another vessel, in which it is washed with clear water, in order to deprive it of every impurity, the water being changed or renewed until it becomes tasteless.

The metal, after being subjected to this washing, is taken out, and ground between two flat pieces of wood until it will pass through a fine brass wire sieve; it is then boiled several hours in water, and is afterwards put upon flakes or filtres of cloth in a stove to dry; when dry, it is again passed through a fine brass sieves, and again boiled in water, for about four hours; after it has undergone the second boiling, I add to the water, in which the metal continued after the second boiling, a little diluted muriatic acid, in order to take away any oxidation of the metal, which might have occurred during the operations above described, or any remaining impurity. It is then again washed in cold water, until the water becomes

tasteless, and being then taken out, dried as before, and again passed through a fine brass wire sieve, it is fit for use in the next stage of my process.

In order to apply the powder to cover the whole surface on one side of any fabric of cloth composed of cotton, linen, or silk, either separately or combined, I proceed as follows: my cloth being scoured, cleaned, bleached, or dyed, as may be required, I pass it through a friction or common calender, to give the fabric a firm and smooth face. I then, by means of a machine, or block, or brush, any of which may be used for this purpose, lay on a uniform covering of starch or paste, of sufficient consistency to work easily; the starch which I use for the purpose, being made by dissolving about one pound and a half of starch in one gallon of water; a covering or coat of the dry metallic powder is then carefully laid on the surface with a soft brush, and the cloth is afterwards dried. In some cases I prefer drying the piece after the starch or paste has been laid on, and afterwards wetting it again with cold water, by a brush on the face, or I immerse the piece upon which the starch or paste has been laid and dried in water, and after the immersion I pass it through padding rollers, so as to leave it uniformly wet. I then apply the metallic powder in the manner before mentioned: when perfectly dry, the piece must be well brushed with a hard brush, to take off all the powder which does not firmly adhere. I then pass the cloth through a friction calender of the ordinary description, employed in glazing calicoes, or I pass it over second hand cards, as hereinafter described, or I glaze it by hand.

The pieces, when thus finished, may have figures embossed upon them, or may be printed with colours, or varnish may be employed, to give various hues to the metallic face, or a watered effect may be given to the fabric. To produce the latter effect, I pass it again through the calender, which for that purpose must have a fine cotton or linen cloth wrapped round one of the cylinders, before the operation. In order to cover part only of any piece of cloth or other fabric, with a metallic surface, I pass the piece through a common or friction calender, in order to make the face firm and smooth to the touch; I then apply starch or paste by means of a machine, or block, or brush, over those parts of the fabric on which the figure is required. I then carefully apply the metallic powder with a soft brush, whilst the impression is wet as before described, until the piece is finished. The cloth is afterwards dried and brushed well with a hard brush, in order to remove all the superfluous powder that may attach to the piece. After this operation the piece must be passed through a slightly heated friction calender, or may be glazed by hand, so as to cause the raising or burnishing of the metallic surface required.

In order to produce the effect of matted or dead silver, I make use of old steel cards, (which have been previously used for carding cotton,) which I so fix upon a board, or in a frame, or in a roller, as that the piece of cloth, or other fabric, may be drawn against them

the smooth way of the card, until the metallic surface assumes a dead or matted appearance.

In order to apply my invention to yarns or thread, in the skein or hank, or in the warp, the same process must be gone through as is hereinbefore described, with respect to piece goods, taking care to use starch thinner in point of consistency. The starch which I use for this purpose, is made by dissolving about one pound of starch to one gallon of water; care must also be taken, that the threads be kept sufficiently separate and distinct, so as to admit of the metallic powder reaching and covering every part of the thread. The dressing machine, commonly used by power loom weavers, answers very well for that purpose.

In applying my invention to paper, I use the same process as is done in piece goods, except that when I again wet the starch or paste, which has been suffered to dry on the paper, I do it in all cases by applying water by means of a brush, as before described, and not by immersion in water. The starch used being of the consistency produced by dissolving about one pound and a half of starch in one gallon of water. In applying my invention to leather, the process is the same as is hereinbefore described, with respect to piece goods, except that I commonly use glue as the adhesive substance for fixing the powder firmly upon the leather, dissolving about four pounds of glue in one gallon of water, and the glue being used when quite hot, the powder being applied either immediately after the glue is put on, or after the glue has dried, and being again wetted in the manner before mentioned, in describing the process of applying the powder by means of starch, to fabrics of cotton, linen, or silk. The friction necessary to give the bright or burnished appearance, may be applied by hand, according to the nature of work required to be done. To produce the appearance of matted or dead silver, second hand cards may be employed as before described. Leather, which has been curried and polished, as for sale, is the best for the purposes aforesaid.

Although I have, in the previous description, stated the size of the vessel, and the description and strength of acid I use, and also that I prefer starch as the adhesive substance for attaching the powder to cotton, linen, or silk, either separately or mixed, or in yarns, or in the piece, or to paper, I declare, that the vessels in which the metals are revived or reformed may be adapted, in point of size, to the extent of the production required; and as tin is soluble by all, or most of the mineral, and some of the vegetable acids, that any of such acids may be used for dissolving the metal, although I prefer and use the muriatic acid; and I further declare that the strength of the acids and solutions employed may be varied, modified, and reduced according to the quantity of precipitate or revived metal required. And I also use starch, in preference to other mucilaginous or cohesive substance, as being more easily reduced to the consistency required by the nature of the work to be performed. And I declare, that I do not claim as my invention, either the solution of the tin or metal employed by means of muriatic or other acid, or the reviving or reforming of the tin or other metal, that process being

well known, or any part of my process taken separately, as the various operations are of constant occurrence in different manufactories; but I do claim, as of my sole invention, the combination and employment of the several operations, of reforming the tin or other metals, in a state of fine powder, the application of the metal, in that state, to the fabric used, and the use of a high degree of friction to raise a metallic surface or figure, at a much less expense than has hitherto been effected, such a result having been heretofore produced by methods in which these combinations have not occurred, and I claim such process, whether the whole be effected by hand or manual labour, or by the use and adaption of any machinery to the purpose. And I further declare, that although I have, in the foregoing description, exhibited my invention of giving a metallic surface to cotton, silk, linen, and other fabrics, by the employment of tin only, yet the same process may be used with corresponding results, whether that metal or silver, lead, bismuth, or antimony, either separately or in combination, is, or are, the metal or metals employed. And I therefore claim as my invention, the process or method of giving a metallic surface to cotton, silk, linen, and other fabrics, by the application of a metallic powder in manner hereinbefore expressed, whether the metal employed be tin, silver, lead, bismuth, or antimony, separately or in combination, and where the metal or metals employed, is, or are, first reduced to a powder, and where, after its application, friction shall be used in raising the metallic surface.

[*Rep. Pat. Inven.*

To JOHN HAGUE, *Engineer, for certain improvements in the method of Expelling the Molasses and Sirop from Sugar.* Dated December 6, 1828.

I, THE said John Hague, do hereby declare, that my invention consists in expelling the molasses or sirop from sugar, by occasioning a pressure of the atmosphere on a surface of the sugar, and this I do, either by withdrawing the air from the under surface, or by compressing this air on the upper surface of the sugar. When I do it by the first method, that of withdrawing the air from the under surface, I make use of a trough or box, (open at the top,) either square, round, or any other proper shape. I prefer having it larger at the top than at bottom, in order that when the sugar shrinks, by the expulsion of the molasses or sirop, it may, by sinking, keep tight round the sides, and thereby prevent the rapid passage of the air between the sugar and the sides of the trough or box.

In this trough or box, at a few inches, or any proper height from its real bottom, I put a false bottom, made of any proper material, (but I prefer sheet copper,) and thickly perforated with small holes: on this false bottom I place a cloth or web, made of hair or some other material.

To the real bottom, or sides of the above described trough or box,

I fix one end of a pipe or tube, the other end of which I fix to the upper side, or some other part of a receiving vessel, placed at a convenient distance below the trough or box. This receiving vessel I furnish with a cock, or some other contrivance, for the convenience of drawing off the molasses when desirable or necessary.

From some part of the above described pipe or tube, I branch off a tubular arm, which leads to an air pump, fixed at any distance from the already described apparatus. The construction of an air pump is so well understood by mechanical persons, that it needs not here being more particularly described.

The operation by this method is as follows:—

I spread the sugar about three inches deep, or any other proper depth, all over the cloth or web that covers the false bottom of the trough or box, taking care that the sugar comes close to the sides of the trough or box, all round. Next, by means of a water wheel, wind mill, steam engine, animal strength, or other power, I set the air pump to work, which partially exhausts the air from the other parts of the apparatus. A partial vacuum being thus formed underneath the false bottom of the trough or box, the pressure of the atmosphere, and the passage of the air through the sugar, separates and expels the molasses, which passing through the cloth or web, and the perforations in the false bottom, falls on the real bottom of the trough or box, and is from thence conducted, by the pipe or tube, into the receiving vessel below. This operation I continue, by keeping the air pump at work, until the molasses or sirop is sufficiently expelled from the sugar.

Before, or during the process, I sometimes find it desirable to moisten the sugar with water, lime water, or some other liquid.

When I do it by the other method, that of compressing the air on the upper surface, I make use of a trough or box, covered on the top, which I furnish with a false bottom, and cloth or web, as by the first method. The expelled molasses I convey from this trough or box, through an aperture, pipe, or tube, to any vessel, or place, destined to receive it.

The operation by this process is as follows:—

Having prepared, and spread on the cloth or web, the sugar to be operated upon, as by the former method, I, by means of a force pump, bellows, or some other contrivance, worked by some power, either natural or artificial, compress the air on the upper surface of the sugar, which produces the same effect on it as the operation first described. [*Ib.*

To George Scott, *Engineer, for certain improvements on, or additions to Windlasses, and relative Machinery, applicable to naval purposes.* Dated March 20, 1830.

The patentee, in his specification, directs the "bits" of the windlass to be made of cast iron, and they are represented in the drawings of a trilateral form, having their angles rounded off. These

bits, or bearings, instead of being fixed, as in the windlasses of ordinary construction, are moveable on an axis formed near their base, and working in two additional bearings that are firmly affixed to the deck of the ship by any approved means. The beam of the windlass revolves on the centre of the bits, and is furnished with ratchet wheels and clicks as usual. A cross bar, secured by screws at either end, extends across the windlass above the beam, to prevent any distention of the bits, and to allow of the free action of the beam on its axis. Beneath each bit, and at a right angle with the axis, are placed several pairs of strong steel springs, similar to those employed in carriages, for which spiral springs may also be substituted varying in size and number, according to the tonnage of the vessel to which they are to be adapted. The effect of employing these will be, the counteracting any sudden strain or jerk of the vessel on the cable.

To attain this object more effectually, the patentee proposes to affix an additional apparatus to the cable, which is formed of two cylindrical boxes, the inner one so arranged as to slide within the other, and of sufficient diameter to admit of the passage of the cable to which it is intended to be applied. In the space between the two boxes are two or more helical springs placed one within the other, and consequently gradually decreasing in diameter, according to the number employed and the strength required. At one end of the apparatus is a stopper, formed of a moveable and a fixed jaw of metal, which grasps a link of the cable, and the whole is secured by two distinct pieces of cable attached to the bits of the windlass. When a strain is exerted on the cable, the inner cylinder is compressed as the progress of the former is arrested by the stopper before mentioned; and the springs, which are acted on by means of a small projection, extending around the inner cylinder, produce the elasticity required.

A modification of this latter apparatus is described, in which several pairs of flat springs, inclosed in a square metal box, with a sliding partition, are substituted for the helical springs and inner cylinder; and in conclusion the patentee states, that he does not confine himself to these two methods, but claims as his invention the use of springs generally, when applied to windlasses. [*Ib.*

To JOHN FREDERICK SMITH, *Esq. for certain improvements in preparing and Finishing Piece Goods made from Wool, Silk, or other Fibrous substances.* Dated February 12, 1830.

THIS patent is obtained for the application of the effect of centrifugal force, acted upon by a counteracting pressure, to the purpose of preparing and finishing piece goods of various fabrics, which is accomplished by an apparatus constructed as follows:—

A cylinder being affixed horizontally in bearings placed in the interior of a square box of proper dimensions, the fabrics to be operated on are wound around it, the ends of each successive piece being sewed or pinned to that already on the cylinder, so as to form

one continued length; and being passed alternately through three beams (similar to those used in ordinary gig mills,) in order to give it sufficient tension. A small bar is placed near the base of the cylinder, with a strap attached to it, extending the whole width of the cloth. This strap is passed over the cylinder, and is of sufficient length to encircle the whole. The opposite end to that affixed to the bar alluded to, is left loose; and this suspended part of the strap (which strap the patentee prefers to be made of Russia drill,) is kept distended by means of a small rod, extending the whole of its breadth, and a number of leaden weights, weighing together about five pounds. At one side of the box enters a steam pipe, from which an arm proceeds at right angles to it a short distance upwards, and extends across the under surface of the cylinder. This arm is perforated with numerous small holes, which throw jets of steam on the fabric as it is wound on the cylinder, that consequently impart a warm moisture throughout. This, it is stated, will much facilitate the operation, and give additional lustre to the cloth. The cylinder is caused to revolve quickly, when the centrifugal force exerted on the cloth is counteracted by the opposite pressure of the weighted strap above described, and produces an equable and excellent finish on the article. The rate at which it is desirable the cylinder should revolve, is about one hundred times in a minute; and this motion continued for about an hour and a quarter, will be found sufficient for general purposes, but the velocity and time of duration may be regulated according to circumstances.

It is observed, that in applying this process to fabrics of cotton, and silk, and to bombazeens and stuffs, the above method is all that is necessary to be adopted; but in worsted, or worsted and silk goods, it is expedient to subject them to the operation, both prior and subsequently to dying. With woollen cloths, an entire roll of Russia drill should be employed, extending through the whole length of the cloth, so as to keep it perfectly smooth; and the patentee recommends it to be then passed through the machine for which he obtained a patent on the 11*th January*, 1825, observing however, that this machine is then to be employed without the cutters. [*Ib.*

To WILLIAM GRISENTHWAITE, *Esq. for certain improvements in Steam Engines.* Dated February 12, 1830.

MR. GRISENTHWAITE commences his specification by informing us, that in the wheel described by Watt, which he caused to work by *mercury alone*, he employs pieces of iron, or other solid metal, in a small quantity of mercury, sufficient to float them, and he attaches rollers to reduce the friction, in case they should not float clear of the wheel. Instead of the hollow wheel, he sometimes substitutes a series of vessels, (of what shape we are left in ignorance,) which are fixed around the wheel, and have communication pipes proceeding alternately from the part of the vessel nearer the axis to that more distant from it.

A steam pipe passing through the centre of the axis of the wheel, communicates with a spiral tube, which revolves with the latter, and, (we presume,) is in consequence placed horizontally, though this is not explicitly stated: woven wire is wound around the spiral, and the bottom being immersed in cold water, it serves as a condenser.

The patentee occasionally employs mercury in lieu of oil, to lucubrate the bearings, which, he adds, may be also applied to machinery generally. The boiler is constructed of a series of pipes, connected with chambers, and pieces of flint or coke are directed to be placed between them, in order to "*filtre out*" the heat.

The above is an epitome of the specification, which is entirely unaccompanied with drawings, and evidently proceeds from a hand but little qualified to draw up a document of so much importance; however, we greatly doubt, whether much loss would be sustained, even if this circumstance were to be the cause of vitiating the patent. We may add, we were not before aware that Mr. Watt worked a wheel by "*mercury alone*," and require more substantial evidence before we credit the circumstance of his having been gifted with powers so miraculous. [*Ib.*

FRANKLIN INSTITUTE.

Monthly Meeting.

The stated monthly meeting of the Institute was held at their Hall on Thursday evening, October 28, 1830.

Mr. Henry Troth, was appointed chairman, and

Mr. F. Fraley, recording secretary pro tem.

The minutes of the last meeting were read and approved.

The following donations were presented to the Institute, viz.

By Mr. James Baker.

The Life of James Otis, of Massachusetts.

A Practical Treatise on Dying and Calico Printing, by Thomas Cooper.

A Narrative of a Journey to the Shores of the Polar Sea, by Capt. John Franklin.

Views of the Mines, Minerals, &c. of the Western Section of the United States, by Henry R. Schoolcraft.

A Memoir of John Aiken, M. D.

The Constitution of England.

The Science of Mechanics, by Z. Allen.

An Introduction to the Knowledge of Mineralogy, by W. Phillips.

La Fayette in America, in 1824 *and* 1825, *or a Journal of a Voyage to the United States.*

Memoirs of the old Schuylkill Fishing Company, and Gloucester Hunting Club.

The Young Artist's Assistant, or Elements of the Fine Arts, by W. Enfield, M. D.

By Mr. John O'Neill.

The Posthumous Works of Frederick 2nd, king of Prussia, 13 vols.

By Mr. Thomas Harper.

The Report of the Schuylkill Navigation Company, for 1822, 1825, 1826, 1827, 1828, *and* 1829.

By Isaac Hays, M. D.

The Fifth Annual Report of the Chesapeake and Delaware Canal Company.

The Library of Entertaining Knowledge, vol. 3. *part* 1.

By Mr. James Kite.

The Philadelphia Album, vols. 1*st and* 2*nd.*

By Mr. James Legare, of Charleston, South Carolina.

An Address delivered by the Agricultural Society in Charleston, S. C.

By Mr. Adam Ramage.

Two brass castings, (heads of Franklin.)

By Mr. D. M. Lewis.

A model of the roof of a house covered on the Russian plan, with sheet iron.

By Mr. B. N. Fyler.

A model of his improved stone rubber, and a model of his improved marble rubber.

By Mr. John Cook.

A specimen of medraporite.

By Mr. Thomas Fletcher.

A specimen of native gold from the mine of the Messrs. White, in Spottsylvania county, Va.

By Mr. John Ronaldson.

A specimen of gypsum, (selenite.)

The corresponding secretary laid on the table the following works, received in exchange for the Journal of the Institute, viz.

The Magazine of Useful and Entertaining Knowledge, for September.

The Mechanics' Magazine, and Journal of Public Internal Improvements, for September.

The American Journal of Education, for September.

The Illinois Monthly Magazine, for October.

The North American Review, for October.

London Journal of Arts and Sciences, for September.

The Mechanics' Magazine, for September.

The Register of Arts and Journal of Patent Inventions, for September.

The Repertory of Patent Inventions, for September.

Mr. Charles Potts submitted for examination a working model of a steam engine with his improvements, accompanied by a communication, which was read, and referred to the committee for publication.

Professor A. D. Bache made a verbal communication on the sub-

ject of fusible metal plates for locomotive steam engine boilers, and submitted a plan with drawings.

Professor W. R. Johnson, communicated several answers he had received to queries proposed by him on the subject of the explosion of the boilers of steam engines.

Mr. S. V. Merrick read a letter he had received from Mr. Charles M'Allester, jr. on the explosion of the boiler of the steam boat Caledonia.

On motion, the farther discussion of the explosion of steam boilers was postponed until the next meeting.

HENRY TROTH, *Chairman.*

F. FRALEY, *Recording Secretary pro tem.*

Use of Chloride of Lime in the United States Navy.

WE are happy to learn that in the United States sloop ———, recently returned from a cruise in the West Indies, the chloride of lime has been employed with good success. The offensive smell of the bilge water was instantly removed by dropping into it a small quantity of this article. The efforts of the officers to sweeten water for their table was not so successful. The smell was removed, but the taste of chlorine remained. Had they, however, passed the water through pulverized charcoal, previously well ignited, they would have obtained it perfectly healthy and pure. We have heard the bilge water in our packet ships loudly complained of: a useful hint may be taken by these vessels from the above.

Use of Chloride of Lime on board a Spanish fleet, in the summer of 1829; *from the National Intelligencer of June 5th,* 1830.

To the Editors.—We have been favoured with the perusal of the reports from the surgeons of the Spanish fleet, directed to the commandant-general of the station at Cuba, respecting the use of chlorine, which are highly interesting; affording additional evidence, if more could be required, of the extraordinary powers of that article in changing an atmosphere rendered highly offensive and pernicious to health, to one devoid of effluvia, and perfectly salubrious.

On the 11th of July last, the fleet destined for the invasion of Mexico, conveying, in addition to the usual compliment of mariners, a large number of soldiers, was overtaken in the Gulf of Mexico by a violent tempest, which continued for several days. The severity of the storm rendered it necessary to remove the windsails, and to close, not only the ports of the lower gun deck, but likewise those of the main deck, and to place on the hatches. In this condition of the ships, with such a crowd of persons confined together, in the middle of summer, within the tropics, without fresh air, putrid fever and malignant dysentery soon made their appearance. The air is described as possessing, in addition to a highly offensive effluvium,

an acrid heat, burning to the skin, with a degree of density that arrested respiration and produced giddiness.

At this moment of distress and anxiety for the safety of all on board, the chlorine was used with the most decided and happy effects. Twelve vessels, containing one ounce each of the chloride of lime, in solution with water, were suspended on the birth deck, four were placed on the orlop deck, and two in the gun room. In the space of two hours, the atmosphere lost all its deleterious qualities, and became perfectly agreeable, leaving nothing perceptible but the smell of tar, which always exists more or less in ships. The solutions were renewed every twenty-four hours; but the chloride undissolved at the bottom of the vessels was then sprinkled on the decks, and thrown into such vessels as it became necessary to cleanse. During the whole of the campaign, which lasted three months and a half, the atmosphere was preserved in this pure state by the chlorine, to which all the surgeons unite in attributing the very few instances of death that occurred in the fleet, when there existed such fruitful sources of fatal disorders.

In these reports we find the experiments of Labarraque confirmed. Putrid meat, immersed for two hours in a solution of one part of the chloride of lime with forty parts of water, after being several times washed in fresh water, lost its disagreeable odour, and became as agreeable to the taste as if no putrefaction had ever taken place. It is likewise added, that the chloride never incommoded, in the least, the healthy or the sick. Two cases of pulmonary consumption were particularly noticed, in which not the least irritation of the lungs could be perceived.

While inviting public attention to the signal virtues of the chlorine, it should not be confounded with the disinfecting gases of Morveau and Carmichael Smith, so much condemned in Trotter's Medicina Nautica.* B.

[*Silliman's Journal.*

Note on the Fabrication of Blister, and Cast Steel, at Sheffield, in Yorkshire. By MM. Coste *and* Perdonnet.

Steel of cementation (blister steel,) is made at Sheffield, of Swedish iron, by a process which has been often described, and relative to which, we shall not therefore go into details, except to describe the cementing furnace, the exact dimensions of which we have been able to procure.

Figs. 1, 2, and 3, show the arrangement of the furnace. It is rectangular, and covered by an arched vault; it contains two cement-

* The quantity of the chloride of lime proposed to be furnished to a ship of the line, by the Spanish surgeons, in their report, is fifteen pounds a month, which in this city would cost about two dollars.

ing troughs, C, constructed of brick.* These troughs are two and a half feet wide, three feet deep, and twelve feet long; they are

Fig. 1.

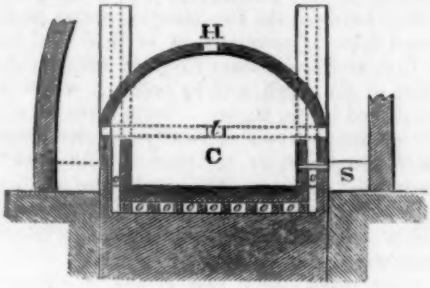


Fig. 2.

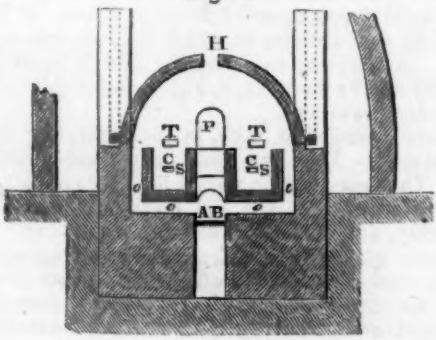
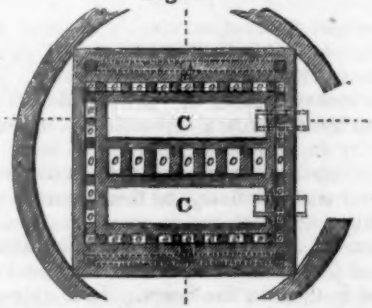


Fig. 3.



placed on each side of the grate, A, B, Fig. 2; the latter extends the whole length of the furnace, which is from thirteen to fourteen feet; it is fourteen inches wide, and is from ten to twelve inches be-

* These troughs are sometimes made of refractory stone.

low the bottom of the troughs. The height of the culminating point of the vault above the trough is five feet six inches. The bottom of the troughs is nearly on a level with the floor, so as to prevent the necessity of lifting the bars of iron very high in charging the furnace.

The flame rises between the two troughs, passes underneath, and circulates around them by openings, or vertical and horizontal canals, *o*, Figs. 1, 2, and 3; it issues from the furnace by an opening, H, in the centre of the vault, and by holes, *t*, which communicate with chimneys placed in the angles. Some furnaces are noted for a greater number of chimneys symmetrically disposed around the structure. In others, the partitions are pierced with vent holes, which are opened during the cooling. The whole furnace is situated in a vast cone of brickwork from twenty-five to thirty feet in height, open at the top. This cone increases the draught, regulates it, and conducts the smoke out of the establishment.

The furnace has three doors, two T, Fig. 2, above the troughs, which serve for the introduction and withdrawal of the bars; they are seven or eight inches square. In each of them is fixed an iron plate, turned up at the edges, on which the bars rub without injuring the wall. A workman enters by the middle opening, P, to arrange the bars; and by the holes, S, Fig. 1, in the sides of the trough, the trial bars are drawn out.

The bars are arranged in beds, in the cementing troughs, with powdered charcoal. They are about three inches wide and four lines thick. They must not be placed too near each other, lest they become soldered together. The last layer (which fills the trough,) is formed of clay, and is four or five inches thick.

The furnace is gradually heated, attaining its greatest intensity in about eight or nine days. The cooling, which must be progressive, lasts five or six days, and the whole operation from eighteen to twenty days, and sometimes longer, according to the intended quality of the steel. There are consumed, during this time, about thirteen tons of pit coal.

Fabrication of cast steel.—Cast steel is made of blistered steel or steel of cementation. It is broken into pieces, put into an earthen crucible, and heated in a common wind furnace. This furnace is a foot or fourteen inches square, and two feet deep.

It is closed on the top with a moveable cover composed of bricks bound together by an iron band. Several of these furnaces extend along a wall, and are connected with a wide chimney. The top of them is on a level with the floor, and their common ash pit is a cellar about ten feet high.

The crucibles, of very refractory clay, are sixteen or eighteen inches deep, and five inches in diameter. About forty pounds of steel are melted in them in five hours. In a state of fusion, it fills rather more than half a crucible; the latter are simply covered with an earthen slab. One of them will not serve for more than three operations.

No fuel is used but good coke; that which has been prepared in ovens is preferred. The melted steel is poured into moulds held

perpendicularly, and when full, an iron weight is laid on the top to prevent the melted metal from boiling out of the mould, but not so heavy as much to increase its density. [*Ann. de Chimie.*

Practical observations on the Pneumatic Process for Expelling Molasses and Sirop from Sugar.

A PAMPHLET has recently appeared with the above title, written by a Mr. Crosley, who states himself to have superintended, for many years, and on an extensive scale, the pneumatic process for expelling molasses from sugar; it contains some useful and practical information on the subject, although blended with much personal invective against the original inventor and patentee, Mr. Hague.

Of the points of disagreement between the above named parties, and their relative merits, it is not our intention to treat, but shall confine ourselves simply to extracting such portions of the pamphlet as we may consider of general utility, with this view we select the following:—

[*Ed. Rep. Pat. Inven.*

Observations on the Apparatus and Operation upon Raw Sugar, according to the specifications of Mr. Hague's patents.

THE withdrawing of the air from the under surface of the sugar, is decidedly the only mode of effecting, upon a scale of business, the expulsion of the molasses or uncrystallizable sugar, containing the carbonaceous and other substances adhering to each crystal of raw sugar. Molasses, properly so called, is the uncrystallizable part of the cane juice, and the greatest portion of it separates, by its own gravity, from the raw sugar, during the period of the curing, in the colonies, as the sirops and treacle separate from the refined and bastard sugar during the operation of claying.

Compressing the air upon the upper surface of the sugar, is only suitable to experimental workings in domed vessels.

The first method, as described by Mr. Hague's specification, is effected in a trough, or box, square, round, &c. The pans which the writer found best suited to operations of business, were oblong squares, of various dimensions, made of wrought or cast iron; the former, if made in a proper way, are to be preferred.

In these pans the false bottom is placed at a proper distance from the upper edge of the pan, according to the depth or quantity, and quality of the sugar intended to be at one time operated upon. In lieu of sheet copper, thickly perforated with holes, as described in the specification, a wooden bottom, properly made, will answer best, which may or may not be covered with wire work, according to the construction of the wood. The hair cloth is placed on the false bottom, which must be fixed in the iron pan in such way, as to pre-

vent the passage of the air at the edges or sides; and unless the false bottom and the sides are thus properly secured, a considerable portion of the cleared sugar will pass into the extracted sirop below, and other effects be produced detrimental to the operation.

The sugar with which the trough or box is to be charged, is, according to the specification, to be "*previously moistened regularly with water, lime water, or some other liquid.*" Such was the first operation of the patentee on a pound of sugar, and, with the great power used by him, it was effectual; but when he followed the same principle upon a larger scale, it was clearly ascertained that, *by mixing water with the sugar previously to charging the pans*, the desired effect *could not be obtained.* The complexion and appearance of the sugar under operation was so discouraging, from the irregularity of its working, and the deterioration in lieu of improvement, became so apparent, and increased the longer the action of the atmosphere was upon the sugar, that any person making the experiment, in the way described by the specification, or viewing the first operations of the patentee upon a hogshead of sugar, would, like the gentleman who first became interested in this invention of "*certain improvements,*" as they are called, have turned from it in disgust, or abandoned the concern altogether as he did.

The raw sugar must be prepared previously to being operated upon by the pneumatic process, and the writer found that such preparation was most essentially requisite; that a difference in preparation is necessary, according to the qualities of the sugar to be operated upon; that, without a strict adherence to this first necessary point, the operation would fail altogether; and that the operation could *only be performed by subsequently moistening the sugar during the operation, from time to time, varying as the quantity and quality of the sugar varied*, and that such moistening was not to be effected by certain quantities, but *by uncertain quantities of water* or liquid, according to the skill of the workman; that moreover it was necessary, during the whole operation, to be attentively watchful to *regulate, by the barometer and by appearances, the pressure and passage of the atmospheric air:* several other minutiæ of manipulation are requisite to produce an improved sugar, and a regular discharge or expulsion of the molasses, as it is called, not in one pan only, but in several pans of various qualities of raw sugar, working by one and the same main of pipes, connected with the air pumps. The writer also found, that unless the mode of operation before in part described, with many other very important particulars, which can only be known by practical observation, be strictly observed, the process could not be rendered available, and completely effective, for the purposes of business.

By the patentee's method, the separation of the molasses commenced at the bottom, or under surface of the sugar resting on the false bottom. By the writer's improved method, the separation commences at the upper surface, and thereby the pan is half discharged of the improved sugar, ere any portion of the extracted colouring matter has passed through the false bottom into the space below.

By the patentee's method the sugar soon becomes, by the pressure of the atmosphere, a mass resembling clay; and if, perchance, upon two or three inches thick, by a great power, an extract is obtained, (which then can only be got by subsequent waterings,) the quantity of cleared crystals is considerably reduced; whereas, by the improved method, the sugar is kept free, a less quantity of water is used, and the weight of cleared sugar is considerably greater, perhaps from ten to twenty pounds per cwt. more. Indeed, so sparing was the writer of the use of water, that he actually worked, with success, a pan of sugar by *steam only*, which condensed upon the surface of the sugar, and yielded a valuable and beautiful product. This latter mode seemed not suited to the management of workmen, as it required too nice a discrimination and attention.

A comparison of sundry methods for Expelling the Molasses and Sirop from Raw Sugar.

1*st. The Pneumatic Process.*

By the pneumatic process, raw sugar of any quality, and in any quantity, can be completely cleared from the colouring matter adhering to its crystals, in the space of from six to twelve hours, by means of air pumps; the liquid generally employed, to obtain the partial solution of the raw sugar, is pure water, according to the purposes the cleared sugar is intended for, whether to resemble crushed or clayed sugar for sale, or for the immediate or deferred use of refining. The cost of power by steam engine, labour, and all incidentals, under a proper management, in London, (where coals are at a higher price than in the country,) is about four-pence to six-pence per cwt. on the raw sugar. The crystals of sugar are not crushed by pressure, or deteriorated by the action of heat; on the contrary, the cleared sugar is rendered stronger for the purposes of refining, and is of richer saccharine quality than any other sugar whatever, manufactured by the application of heat. The pneumatic sugar does not contain more impurities, nor yield a greater loss when refined, than in lumps; it can be used for bottoming up of certain descriptions of refined goods, thereby saving the destruction, for that purpose, of inferior lumps, as is customary in refineries; it is superior to lumps when melted for further processes of refining, because the sugar has been produced without the aid of heat, which, in proportion to the degree employed, and repetition of the application, weakens the crystallizing properties of sugar, and engenders molasses, and the colouring substance which adheres to the crystals of sugar, whether the first products of the cane, (raw sugar,) or the after products, (refined sugar, lumps, and loaves.) The impure part, or coating of the crystals, is effectually separated in a state of solution, and when properly worked, yields, by evaporation, a regenerated raw sugar, suitable for another operation by the pneuma-

tic process, or it may at once, (after filtration,) be blended with the sirops then in course of refining, and made into lumps. Again, if the refiner should prefer making the first products of the raw material into loaves or lumps of an inferior quality, he can, by the use of the process, separate a portion only of the colouring matter, and the quantity of raw sugar so cleared, will be greater in proportion to the inferiority of the quality required, or very inferior raw sugars may be discharged of their colouring matter, and then refined into loaves and lumps of fine quality. In the refineries, where a steam engine is at present employed, the power thereof might be in part detached during the other workings of the house, and wholly so after those workings were finished, to complete the pneumatic operation upon the quantity required for the refine of the following day. The process can also be employed upon bastard sugar, which yields a beautiful product, generally equal in colour to that obtained from raw sugar, but inferior thereto in point of strength and quantity, for reasons hereafter named. The prices obtained for bastard sugar, must, however, govern this second operation upon the residue of a refine. Such cleared sugar, from bastard, might be suitable to the consumption of the grocers, for increasing the colour of sugars for the scale.

2nd. Claying Process.

The process of claying raw sugar is so well known, that a description of it would be superfluous; suffice it to say, that claying is only adapted to the discharge of the molasses and colouring matter adherent to the crystals when new, or immediately after they have been obtained by evaporation; it is, therefore, suitable to the colonies only, and not to Europe. It was attempted in this country, about forty years ago, to discharge, by means of claying, the colour remaining in union with raw sugar; and it is remarkable, that this attempt by claying was made in the very buildings then called the Claying Sugar Houses, and in the same rooms where the pneumatic process was first effectually employed; and the coincidence is still more striking, as nearly similar troughs or pans were employed. £100,000 was expended, and the attempt abandoned, after a few years of trial.

Thus, that which had been tediously and imperfectly performed by claying, and the action of gravity, was, forty years afterwards, expeditiously and completely effected, by the intervention of a well known principle, by pure water, and by mechanical power.

3d. Hydraulic Process.

The process of discharging the molasses or colouring matter, by the hydraulic or other presses, is known to every refiner; and, therefore, a particular description of the operation is unnecessary. Raw sugar, to be thus operated upon, requires considerable labour in the preparation; and, when so prepared, is reduced to a species of expressed pulp, in which a considerable portion of the colouring matter

still remains, and the crystals are broken; for these reasons such sugar is only fit for refining.

4th. Process of Meltings.

The process of meltings being the one in use, particularly in those refineries worked on the late Mr. Howard's principle, requires a more especial notice and comparison with the pneumatic process. The advantages of the latter have been stated; the former is well known to every refiner of sugar; but it is proper to observe, that meltings produce an imperfectly cleared sugar by various operations, requiring much room and labour, in about as many days as the pneumatic process requires hours to produce pure and perfectly cleared sugar; and these prompt and efficacious results are accomplished by a cheap operation, not injurious to the crystallization of the products. In short, to work meltings as a primary procedure in refining, is, in fact, a single refine of the raw sugar, before it is further operated upon for finer products.

The deteriorating effects of heat upon saccharine solutions are universally admitted; the advantages of this improved system of separation must, therefore, be evident, and must apply to the cane juice, and to all solutions, whether of raw, clayed, or refined sugar, and to the sirops which exude, or are discharged therefrom by the various methods of working. [*Rep. Pat. Inven.*

Account of the Liverpool and Manchester Rail-way.

The following description of the Liverpool and Manchester rail-way, is derived from an official account of the work, by Henry Booth, Esq. treasurer to the company of proprietors,* and a "description of the rail-way," by James Scott Walker.

The Plate, No. II. exhibits a plan and section of the rail-way, with the branch lines, adjacent canals, roads, &c.

Explanation of the Section.

A, inclined plane from Wapping to Edgehill (part of the tunnel.)	Length	1970 yds.	rise 1 in 48.
a, level.	"	1000 "	
a, *a*, Wavertree, Broad Green, Roley, Huyton,	"	3⅛ miles,	fall 1 in 1092
B, Whiston inclined plane,	"	1½ "	rise 1 in 96
b, Rainhill level,	"	1⅞ "	
C, Sutton inclined plane,	"	1¾ "	fall 1 in 96
c, over Parr Moss to the Sankey canal and viaduct,	"	2½ "	fall 1 in 2640

* An account of the Liverpool and Manchester rail-way, comprising a history of the parliamentary proceedings preparatory to the passage of the act: a description of the rail-way, and a popular illustration of the mechanical principles applicable to rail-ways; also an abstract of the expenditure, &c. By Henry Booth, treasurer to the company.

D, Sankey to Newton, E, Newton to Bury Lane,	"	6¼	"	fall 1 in 880
F, Chat Moss, - - - -	"	5½	"	rise 1 in 1200
G, Barton, Eccles, Salford, Manchester, - - - - - -	"	4½	"	level

g, level of Water street.

The Liverpool end of the rail-way may be properly said to commence in the company's yard in Wapping, a short distance from the north end of the Queen's Dock. Here the lower entrance of the great tunnel is approached through a cutting 22 feet deep and 46 feet wide, affording space for four lines of rails, between which there are ranges of lofty cast iron pillars, supporting beams and flooring of an elegant pile of warehouses erected over or across the excavation. In the spacious area thus formed beneath these warehouses, the finer sorts of goods are to be received from, and delivered to, the warehouse keepers, by means of hatchways in the floors above, to the precise spots beneath which the wagons may be pushed on side rails fixed for the purpose, and communicating with the main double line of rails by means of turning rails, fixed on large moveable circles of wood. Wagons loaded with coal or lime are to pass underneath the warehouses to the open wharfs at the Wapping end of the station. The tunnel is 22 feet wide and 16 feet high; the sides are perpendicular for 5 feet in height, and surmounted by a semicircular arch of 11 feet radius. The height from the roof of the tunnel upwards to the open surface of the ground, varies from 5 to 70 feet. Where the natural rock could not be united to support the superincumbent mass, an artificial arch work of brick has been introduced. For about 270 yards from its mouth, the tunnel curves to the right, or south-east; the visiter then reaches the bottom of the inclined plane, (A in section,) the rise of which, (1 in 48,) is regularly maintained to the farther end of the tunnel at Edgehill, a distance of 1970 yards. From the bottom of this inclined plane the light may be seen, on a clear day, at the upper end of the tunnel. The appearance to a keen eye is that of the upper hemisphere of the moon seen dimly through a hazy cloud, and diminished almost to a speck in the distance, as if viewed through an inverted telescope. This feeble light gradually increases in size and brightness as the traveller advances, and when within half a mile of it, if the atmosphere be particularly fine, a letter may be distinctly read without the help of a candle. To view the tunnel, however, to the greatest advantage, it should be visited when illuminated by gas. The public had first an opportunity of thus gratifying their curiosity, in the month of July, of the last year, when it was opened by the directors. "It was lighted by jets, 30 yards apart, fixed from the roof throughout its whole extent, and the effect was grand and beautiful. The lights nearest the spectator appeared a considerable distance apart. Farther on they approximated in the perspective, and finally became blended into a continuous and brilliant line of flame, fading away from a pure white to a fine red colour. The whitened roof and

sides, contiguous to each light, were so strongly illumined, that the whole vista appeared like a succession of superb arches, formed through massy parallel walls, the intervening spaces being left in comparative darkness."*

On emerging from the tunnel at Edgehill, the traveller enters a spacious area 40 feet below the surface of the ground, cut out of the solid rock, and surmounted on every side by walls and battlements. Immediately on the left he perceives the mouth of another tunnel, parallel with the entrance of that from which he has just emerged, but of smaller dimensions, being only 15 feet wide and 12 feet high. This smaller tunnel is 290 yards long, inclines upwards in a direction opposite to the other, and terminates in a large yard in Crown street, which is the principal station for the rail-way coaches, and is intended to serve also as a coal depot, for the supply of the higher districts of the town. Proceeding onwards, the visiter passes through a Moorish archway, (at present unfinished,) which connects two houses, appropriated to stationary engines, which are intended to draw loaded wagons up the inclined plane from the Wapping end of the tunnel. This structure is from a design of Mr. Foster, an architect, who has contributed greatly to the embellishment of Liverpool, but who has not always displayed so pure a taste as he has done in this instance. The chimneys of the two engine houses, which are connected together by this archway, are carried to the height of about 100 feet, and form two very striking additions to the scene.

The traveller now finds himself on the open road to Manchester. The descent as far as Huyton, (*a*, *a*, in section,) is so slight and uniform as not to be perceived by the eye, but is still sufficient to give a considerable mechanical advantage to a load passing in that direction. The road a little beyond Wavertree is carried through a deep marl, cutting under several massive stone archways; and beyond this we enter a ravine, cut through the solid rock of Olive Mount, for the depth of 70 feet. "This cutting is the largest in stone on the whole line, is little short of two miles in length, and is one of the most remarkable portions of the whole undertaking. It is at once unique and picturesque. The traveller here finds himself on a fine level road upwards of 20 feet in width, but which is seen for a great extent both ways, and walled in, as it were, with solid rock, rising almost perpendicularly on each side to a height of 70 feet, appears to be of more contracted span; and so diminutive a creeping creature does a man appear at the bottom of the chasm, that the spectator marvels that it is the work of human industry, and is lost in the calculation of the millions of blows with the pick-axe, the amount of human toil, and sinew, and skill, that must have been exerted to remove so prodigious a mass of matter."† The sides of the rock exhibit already the green surface of vegetation, and have,

* "Description of the Rail-way," by James Scott Walker: Liverpool, 1830.
† Walker.

altogether, a more natural appearance than might be expected from so recent an excavation.

The materials dug out of Olive Mount, to form the ravine just described, have served to construct a lofty embankment which next carries the rail-way across the valley of Roby, at a height of from 15 to 45 feet. "Here the traveller finds himself affected by sensations the very reverse of what he felt a few minutes before. Mounted above the tops of the trees, he looks around him over a wide expanse of country, in the full enjoyment of the fresh breeze from whatever quarter it may blow. There is a feeling of satisfaction by no means common-place, in thus overcoming obstacles, surmounting difficulties, in making the high places low, and the rough places plain, and advancing in one straight and direct course to the end in view."*

The inclination of Whiston plane, (B in section,) is so slight that it would scarcely attract notice, did not a decrease in the speed of the carriage indicate that a material alteration had taken place in the facility of draught.

After advancing about half a mile on the Rainhill level, (C in section,) the turnpike road from Liverpool to Manchester passes over the line of rail-way at a centre angle of 34 degrees, by means of what is popularly called a skew bridge. The span of the arch is 54 feet, though the breadth of the rail-way is only 30; and each face of the arch extends diagonally 45 feet beyond the square. It was on this Rainhill level that the experiments took place with the locomotive engines in the month of October last.

Sutton inclined plane, (C,) is similar in extent and inclination to the Whiston plane, the top level being 82 feet above the base of each plane. The road as it passes over Parr Moss, (*c*,) seems to be only four or five feet above the surface; but this embankment, which was formed of the materials dug out of the Sutton inclined plane, is in reality 25 feet thick, having sunk about 20 feet into the Moss.

Over the Sankey Valley and canal, and over the topmasts of the barges, the rail-way is carried along a viaduct of nine arches, each 50 feet span, built principally of brick, with stone facings. The height from the top of the parapets to the water in the canal, is 70 feet, and the width of the rail-way between the parapets, 25 feet.

Another viaduct of four arches, each of 30 feet span, and 40 feet high, carries the rail-way over the valley of Newton. Under the eastern arch passes the turnpike road from Newton to Warrington; and beneath another arch flows a stream, which turns an old corn mill immediately below the bridge.

A few miles beyond Newton we come to the Kenyon excavation, from which above 700,000 cubic yards of sand and clay were carried off to form the neighbouring embankments; the remainder, "deposited as spoil-banks, may be seen heaped up like Pelion upon Ossa, towering over the adjacent land." Near the end of this cutting, the Kenyon and Leigh Junction rail-way joins the Liverpool and Man-

* Booth.

chester line, by two branches pointing to the two towns respectively. This rail-way joins the Bolton and Leigh line, and thus forms the connecting line between Bolton, Liverpool, and Manchester.

The road over Chat Moss is not inferior to that on any part of the line. This hitherto barren waste comprises an area of about 12 square miles, varying in depth from 10 to 35 feet. Towards the Manchester end of the Moss, several neat slated cottages, rows of recently planted trees, belts of wood, and patches of arable land, present indications of the task of reclaiming it having been commenced. The establishment of this Moss farm, has its origin, with "a few spirited individuals who have, in conjunction with Mr. Baines, laid a private rail-way from the main line, at this point, extending to the river Irwell, a distance of nearly two miles, crossing the Warrington and Manchester road, eight miles from the latter. This new *creation* of productive land, which is like a green and grateful spot in the surrounding wilderness, has been effected in the short space of eighteen months, and furnishes a remarkable and important example of the combined power of agricultural and mechanical science: for it is admitted, that but for the use of rail-ways, it would have still remained in its natural sterility. The rail-way employed, which is moveable, is the invention of Mr. Edward Evans, of Liverpool, one of the proprietors. It is in lengths of four yards, each fixed on a longitudinal wood sleeper, a section of which would be an isosceles triangle—the base being the longest side, and serving as a continuous support for the rail upon the moss. These rails may be laid and shifted, so as to serve an acre of ground with marl or manure for half a crown, a small portion only of manual labour being required to propel the wagons. Marl has been extensively used on this farm, which is intersected, or cut into fields, by large principal drains, into which run small under drains, *roofed* with the *top* sod of the moss itself, and at short distances: by these the superstratum is effectually bled of its redundant water. This successful example of skill and industry, will, no doubt, lead the way to the cultivation of the whole of the Moss, which, it is computed, contains an area of twelve square miles."*

From Chat Moss the rail-way passes over the lowlands at Barton, extending about a mile between the Moss and Worsley canal, by means of an embankment; it is carried over the canal by a neat stone viaduct of two arches; it then proceeds through Eccles and a portion of Salford, under six bridges: it is carried over the Irwell by a handsome stone bridge of sixty-three feet span, thirty feet from the water, and then over twenty-two brick arches, and a bridge over Water street, to the company's station in Water street, Manchester, a distance of thirty-one miles from the Liverpool station. The rail-way is there on a level with the second story of the company's warehouses, and by six large doors, or gateways, the wagons may be rolled into them and conveniently discharged or loaded under cover. The

* Walker.

north front of these warehouses leads into Water street, with which the ground floor is level.

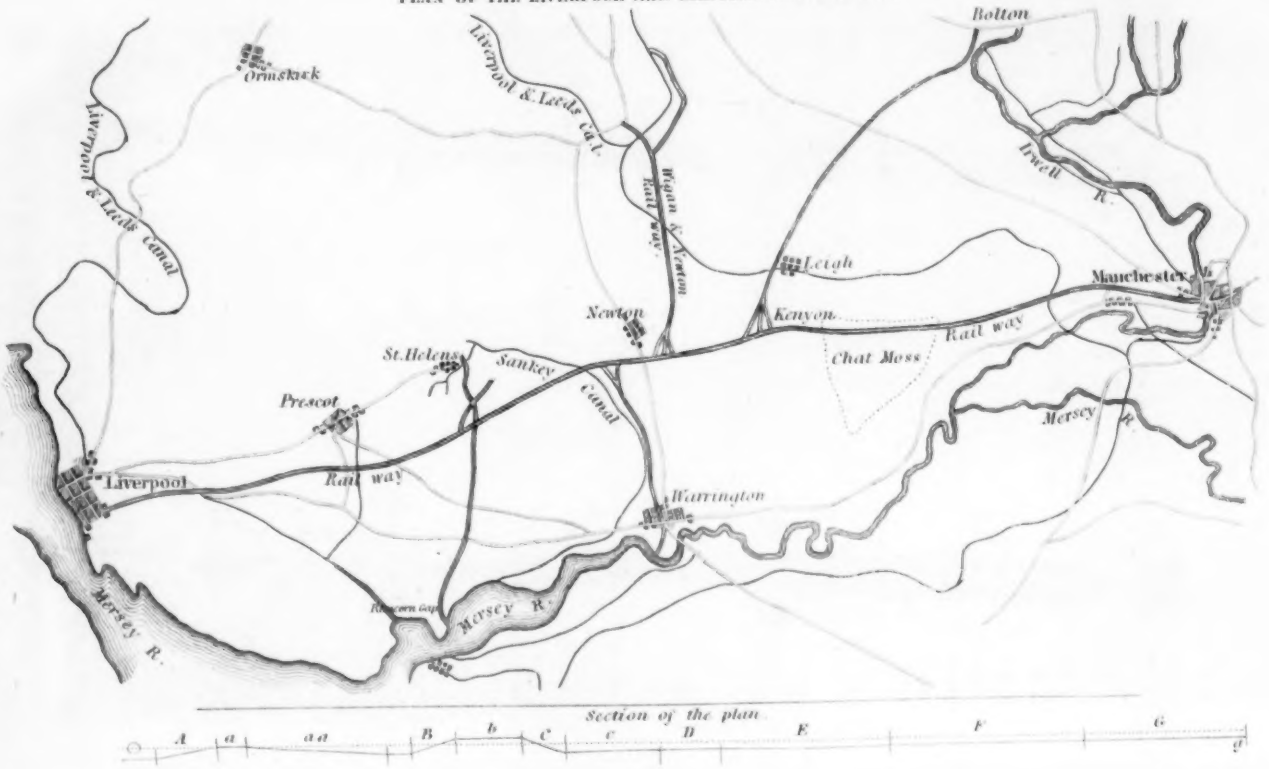
In the *construction* of this rail-way, the first part on which operations commenced, was Chat Moss, the draining of which was begun in June, 1826. In September of the same year, the first shaft of the Liverpool tunnel was opened; and early in 1829, the earth work, (*i. e.* the cuttings and embankments,) along the whole line was in progress. During the whole of 1827, the formation of the tunnel under Liverpool was carried forward with spirit and perseverance. Night and day the excavation proceeded, and many difficulties in the execution of the work had to be overcome. In some places the substance excavated was a soft blue slate, with abundance of water; in other places a wet sand presented itself, requiring no slight labour and contrivance to support, till the masonry which was to form the roof was erected. In passing under Crown street, near the Botanic Garden, for want of sufficient props, the superincumbent mass fell in from the surface, being a depth of 30 feet of loose moist earth and sand. On some occasions the miners refused to work; and it not unfrequently required the personal superintendence and encouragement of the engineer to keep them at their posts. But while some portions of the tunnel were excavated under circumstances of no little difficulty and danger, other portions were hewn through a fine red sand stone, clean, dry, and substantial, and requiring neither props nor artificial arching; the natural rock forming the roof of the excavation. The tunnel was constructed in seven or eight separate lengths, communicating with the surface by upright shafts, through which the substance excavated was conveyed away. On the 9th of June, 1828, it was reported to the directors that the last joining between the several lengths was effected, and at that period all very serious difficulties in the execution of this branch of the undertaking, were surmounted.

In 1828, principally, was effected the piling for the foundations of the piers of the great viaduct over the Sankey Valley; a business of much labour and cost, but indispensable for the security of the superstructure. About 200 piles, varying from 20 to 30 feet in length, were driven hard into the foundation site of each of the ten piers. The heavy ram employed to impart the finishing stroke, hoisted up with double purchase and snail's pace to the summit of the piling-engine, and then falling down like a thunderbolt on the head of the devoted timber, driving it, perhaps, a single half inch into the stratum below, is well calculated to put to the test the virtue of patience, while it illustrates the old adage of "slow and sure."

During 1828, was completed the company's bridge over the turnpike road, and the old mill dam at Newton, and the operations at Chat Moss were carried on without intermission—embanking at each end, and draining, levelling, &c. in the centre portions.

In the spring of 1829, the directors being desirous of proceeding with increased despatch in the execution of the work, instructed the engineer to order the contractors, at the principal cuttings throughout the line, to employ two sets of labourers, and to work by night

PLAN OF THE LIVERPOOL AND MANCHESTER RAIL WAY.



as well as day. The operations accordingly proceeded still more rapidly than heretofore, though it must be allowed at considerably increased expense; and had it not been for the extraordinary wet summer and autumn, the earth work for a complete line of communication between Liverpool and Manchester, might have been accomplished by the end of 1829, or the beginning of 1830, and the rail-way laid down for operations within a few months from that period. As it was, very considerable delay was occasioned by the heavy and long continued rains, besides no trifling expense to the company in pumping the water from the deep cuttings, which were too apt to assume the appearance of a canal rather than a rail-way.

The principal structure completed in 1829, was the company's bridge to carry the Liverpool and Warrington turnpike road over the rail-way at Rainhill.

Before the close of 1829, one road-way along the whole extent of Chat Moss was completed; and on the 1st May, 1830, the Rocket steam engine, with a carriage and company, passed over it. That the practicability of carrying the rail-way over this Moss should have been questioned, is not to be wondered at, considering that it was in some places from 30 to 35 feet deep, and so soft and pulpy that an iron rod would sink through it by its own gravity. The portion of the Moss which presented the most difficulty, was about half a mile on the eastern border, where an embankment of about 20 feet had to be formed above the natural level. The weight of this embankment resting on a semi-fluid base pressed down the original surface; many thousand cubic yards gradually and silently disappeared before the line of road made any approach to the proposed level. By degrees, however, the whole mass beneath, and on each side of this embankment, became consolidated by the superincumbent and lateral pressure, and a little perseverance finally completed the work.

In September, 1829, was commenced the company's bridge over the Irwell—the last great structure on the line of rail-way from Liverpool to Manchester.

The expenditure for the rail-way, up to the 31st of May last, amounted to £739,185 5*s.* 0*d.* In a report dated the 25th of March last, the directors estimated that the total expenditure, including warehouses, machinery, and carriages, would amount to 820,000*l.* but it is supposed that it will not fall much short of 1,000,000*l.* We have not space in this number to give the items of expenditure.

Account of the preparatory experiments for determining the kind of Carriage to be used, and the power to be employed, on the Liverpool and Manchester Rail-way.

Numerous plans were proposed to the directors for facilitating locomotion on the rail-way. Every scheme which the restless ingenuity or prolific imagination of man could devise, seem to have been

liberally offered to the company; the difficulty was to choose and decide.

The great theatre of *practical* experience on rail-ways, was previously the Stockton and Darlington line, and the rail-ways in the vicinity of Newcastle-on-Tyne. All the modes heretofore in use of propelling carriages on rail-ways; namely, by horses, by locomotives, and by fixed engines, had been there exemplified. Facts were wanted to lead to a correct decision, and personal observation seemed necessary in order to arrive at a satisfactory result. The directors accordingly appointed two of their own body, accompanied by Mr. Booth, their treasurer, to proceed to Darlington, and the neighbourhood of Newcastle, to obtain, on the spot, the requisite information, and to report the same to the Board, with their opinion on the subject. This journey of inspection took place in the beginning of October, 1828, and the deputation returned with a fund of information—but of so mixed, and, in some respects, of so contradictory a nature, that the great question as to the comparative merits of locomotive and fixed engines was as far from being settled as ever. One step only was gained; the deputation were perfectly convinced that for the immense traffic to be anticipated on the Liverpool and Manchester line, horses were out of the question. In these circumstances the directors resolved on calling in the assistance of two professional engineers, to enable them to determine which it would be best to adopt, fixed or locomotive engines; and the gentlemen selected for this purpose were Messrs. Walker and Rastrick.

On the 9th of March, 1830, two separate reports from these engineers were laid before the directors. The merits and demerits of each system were therein very fully and fairly stated; and in the opinions of Messrs. Walker and Rastrick, they were pretty equally balanced. The cost of an establishment of fixed engines between Liverpool and Manchester, they were of opinion, would be something greater than of locomotives to do the same work; but the annual charge, including interest on capital, they computed, would be less on a system of fixed engines than with locomotives. The cost of moving a *ton* of goods thirty miles, that is, from Liverpool to Manchester, by fixed engines, they estimated at 6.40*d.* and by locomotives, at 8.36*d.* supposing in each case a profitable traffic *both ways*. But with a system of locomotives, the cost of the first establishment need only be proportioned to the demands of the trade, while with stationary engines an outlay for a complete establishment would be required in the first instance. And it was farther to be considered, that there appeared more ground for expecting improvements in the construction and working of locomotives than of stationary engines. On the whole, however, and looking especially at the computed annual charge of working the road on the two systems on a large scale, Messrs. Walker and Rastrick were of opinion that fixed engines were preferable, and accordingly recommended their adoption to the directors.

Mr. Stephenson, the company's engineer, had always been in favour of locomotive engines, and notwithstanding this decision of

Messrs. Walker and Rastrick, he was still decidedly of opinion that they would be found to furnish the most economical and most convenient moving power that could be employed. The leaning of a majority of the directors continued also in favour of locomotives, provided they could be constructed to consume their own smoke, (agreeably to the provisions of the rail-way act,) and of adequate power, and of a less weight than the engines then in use, which were generally from 8 to 10 tons in weight; the consequence of which was no small injury to the rail-ways, and a proportionate expense in keeping the road in repair. The directors, therefore, determined to obtain, if possible, a locomotive engine, of improved construction, that should comply with these conditions. Mr. Harrison, (one of the directors,) had been for some time of opinion, that the excitement of a reward publicly offered by the company would be the most likely means to obtain for them what they were in search of. In this opinion his brother directors now coincided; and hence the competition, which took place in October last, with all the particulars of which the readers of the "Mechanics' Magazine"* were made fully acquainted at the time.

From this date the question between locomotive and fixed engines was considered to be practically settled. The fitness of locomotives for the purposes of travelling at almost any speed that could be desired, was strikingly exemplified. But there still remained one point to be settled, namely, the *kind of power* to be employed in ascending the inclined planes of Whiston and Sutton. These planes are each a mile and a half long, with an inclination of 3-8ths of an inch to a yard, being a rise of 1 in 96. Stationary engines on the summit, with ropes passing over sheaves or pullies along the whole ascent, are the means resorted to at the inclined plane in the Liverpool tunnel; also on the Darlington inclined planes, and at the collieries in the North. It was quite evident, however, that such a plan of operations in the centre of the Manchester and Liverpool line, with the interruption to be expected from a *change* of the moving power, to say nothing of the danger always to be apprehended from a system of ropes and pullies, was to be avoided if possible. It became an object, therefore, of no small interest, to ascertain the power of the new locomotives on the planes in question. During the trial at Rainhill, in October last, "The Rocket" frequently ascended the Whiston inclined plane with a carriage holding from twenty to thirty passengers, at a speed of from fifteen to eighteen miles per hour; and the ease and regularity with which this was effected, produced a general impression, that even up inclined planes the locomotive engine would be the power employed. Indeed, the feeling at the moment was very prevalent, that it was immaterial whether the engine travelled up an inclined plane or on a level: but subsequent experiments have fully established what it would have been only reasonable to assume *à priori*, that the power of an engine diminishes in proportion to the degree in which the plane is inclined

* See this Journal, vol. v. p. 186, 257.

till it reaches a point when adhesion terminating, the wheels turn round without advancing; and that, therefore, without assistance of some sort up such inclinations as those of Whiston and Sutton, an engine must either go at a less speed, or draw a less weight. For example, "The Comet" locomotive, a new engine on the same plan as "The Rocket," ascended the Whiston inclined plane with about twenty-six tons behind her, with a speed diminishing from the rate of between sixteen and eighteen miles at the commencement, to about three or four miles per hour before she reached the top: but it would be quite erroneous from these data to take the average between three and eighteen, and to infer that the power of the engine was equal to convey a load of twenty-six tons up an inclination of 1 in 96 at 10½ miles per hour; her real power, estimated in a continuing speed with the above load, being only three or four miles, or proportionate to about seven tons up the same plane at fifteen miles per hour.*

On the 14th of June, of the present year, an experiment was made as a preliminary measure to a general opening, well calculated to exhibit the peculiar character of rail-way conveyance, and to put to the test the capabilities of the locomotive engine, both on a level and up inclined planes. On this occasion the directors, in two carriages, proceeded on a journey of inspection from Liverpool to Manchester, and back. "The Arrow," another of Mr. Stephenson's engines, was the proving power. The gross weight drawn was about 33 tons, consisting as follows:—

	Tons.
Stone in seven wagons, - - - - -	20
Weight of wagons, - - - - - -	7
Engine tender and six persons, - - -	3
Two carriages and twenty persons, - -	3
	33

With this load she travelled from the Engine House, Liverpool, to Old Field Lane Bridge, Salford, Manchester, the distance being about 29 miles in 2 hours and 25 minutes, including two stoppages to take in water. Up the Whiston inclined plane she was assisted by "The Dart," an engine of similar construction and power; and the first quarter of a mile of the ascent was accomplished at a speed of 17 miles per hour before the summit was gained, the mile and a half being accomplished in 12 minutes; the average speed being, therefore, 7½ miles per hour. At the top of the ascent "The Dart" was unyoked, and "The Arrow" proceeded with her cargo along the straight and level plane at Rainhill at the rate of 16 miles per hour. On the return from Manchester the engine, tender, and the two carriages, with passengers, constituted the whole load drawn.

* It is worthy of remark, in connexion with this branch of the subject, that in considering the section for a proposed rail-way, the *length* of the inclined planes should be taken into the account as well as the steepness of the ascent; since on a plane half a mile long, it is evident much more may be accomplished than on one three or four times that length.—Mr. Booth.

The first 9¼ miles from Old Field Lane Bridge to Glazebrook Bridge, including the Chat Moss district, were accomplished at a speed averaging from 19 to 20 miles per hour. The whole distance was accomplished in 1 hour and 46 minutes, including stoppages, the speed generally varying from 18 to 25 miles and upwards per hour, and the engine not working to her full power a great portion of the way. The speed up the Sutton inclined plane, (without any assistant engine,) averaged more than fifteen miles per hour. The day was wet, and the rails in some places very dirty; the whole performance, therefore, took place under circumstances by no means favourable, but the result was highly satisfactory.

[*Mechanics' Magazine.*

Cloth of Amianthus.

THE method of preparing amianthus for the purpose of making incombustible cloth, is thus stated in an Italian Journal.

The amianthus is exposed to the action of steam, in a vessel made for the purpose, and which will hold more than 3000 pounds of the mineral, and so that all parts of it may be acted on by the steam. The fibres, by this action, become loosened, and acquire so much flexibility that they are easily separated, so as to obtain thread as fine as silk, and of several decimetres (about four inches) in length.

[*Annales d'Hygiene Publique and Silliman's Journal.*

Notice of the Remarks of the Editor on the Taps and Dies patented by A. LAMONT.

TO THE EDITOR OF THE JOURNAL OF THE FRANKLIN INSTITUTE.

SIR,—Your love of candour will undoubtedly induce you to give a place in your Journal to some notice of your remarks upon the taps and dies patented by me in January last. In your number for April, p. 228, you urge some objections against these dies, which experience has proved do not exist. You say that "if a thread could be cut the whole depth at once, they would act well, but, this, generally, is out of the question." This, sir, is just the case with these dies, for they always cut their full depth at once passing down, and when it is requisite that the thread of the screw should be deep, I use two pairs of dies, following each other in succession.

You also say that "only one cutting thread can be in action at once, and that the most prominent." The reverse of this is the fact, for the last prominent thread cuts first, and every thread in the dies is cutting at the same time. The screw in the dies being an entire circle, adds greatly to their value; for in consequence of this, every screw cut by the same dies, will be of one exact size. Every kind of screw can be cut in this way with the greatest facility and precision.

All the objections that you urge to my improvement are applica-

ble to dies made in the common way, and as your remarks will be received with confidence by the great body of mechanics, you will oblige me by publishing this correction.

Very respectfully, &c.

ARCHIBALD LAMONT.

Pittsburgh, November 1, 1830.

Remarks by the Editor.—As Mr. Lamont's description, attached to his patent, said nothing about the use of different pairs of dies in succession, there was nothing to justify the conclusion that such was his practice. We observed, in speaking of the dies, that "if a thread could be cut the whole depth at once, they would act well." We know enough about cutting screws, to pronounce this impracticable with single dies, excepting in small screws, but with successive dies the object can, undoubtedly, be attained.

In cutting deep threads, in large screws, two, three, or more taps, must also be required. We do not believe that any power which could be applied to a tap would enable it to cut, at once, the box for a standing press screw, or rather, we are certain that any tap would be broken by the power which would be required to force it through.

The foregoing observations are not offered as objections to the plan of Mr. Lamont, which, with his present explanations, we admit to be practicable, and have no doubt whatever of its utility. To what extent it may be applicable, experience alone can decide.

FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

Letter from Mr. J. DOOLITTLE, *respecting the* EDITOR'S *remarks on* Mr. PERKINS' *and* SMITH'S *Paddle Wheels.*

To William Hamilton, Esq. Actuary of the Franklin Institute, Philadelphia.

SIR,—I am happy to learn by Dr. Jones' remarks, appended to my communication to you, on the subject of Mr. Smith's paddle wheels, contained in the last number of the Journal, that my surmise was correct, when I supposed that the specification, or the drawings, or both, had been inadequate to convey a correct notion of the invention, as I saw it. Certainly no person could recognise the features of the child in the portrait drawn by the father.

I do not regret this occurrence, as it affords an additional proof of the impartiality and discriminating judgment of Dr. Jones, for whom I feel a very high respect. It proves also that we were both in the dark, he as it related to the real value of the invention, and myself as regarded his means of appreciating it.

These points being now cleared up, I accept with pleasure the hand of friendship which he proffers.

I am, with much respect, &c.

J. DOOLITTLE.

Bennington, Vt. November 15*th*, 1830.

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